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FURTHER STUDIES IN THE GENUS DODONAEA

BY

EARL EDWARD SHERFF

RESEARCH ASSOCIATE, SYSTEMATIC BOTANY

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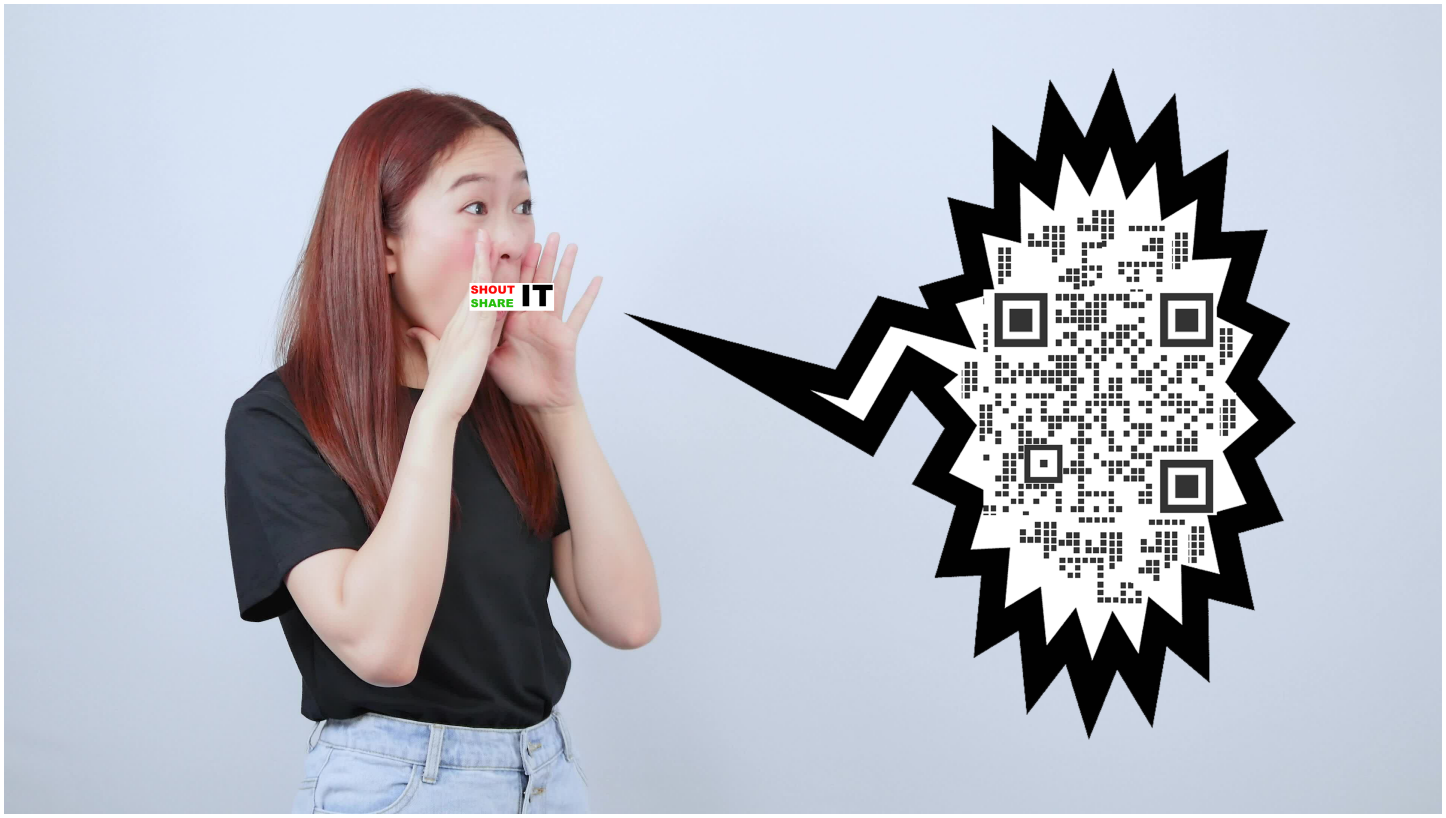
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FURTHER STUDIES IN THE GENUS DODONAEA L.

(FAMILY SAPINDACEAE)[1]

EARL EDWARD SHERFF

Dodonaea viscosa (L.) Jacq. Enum. Syst. Pl. 19. 1760. *Staphylodendron foliis lauri angustis* Plum. Cat. Pl. Amer. p. 18, 1703 and Pl. Amer. Ic. edit. Burm. fasc. 10: 246. 1760. *Aceri vel palituro* [*sic*! *re vera paliuro*] *affinis, angusto oblongo ligustri folio, flore tetrapetalo herbaceo* Sloane Nat. Hist. Jamaica 1[m]: 27, and 2: *tab.* 162, *f.* 3. 1707. *Dodonaea* L. Hort. Cliff. 144. 1737. *Ptelea viscosa* L. Sp. Pl. 118. 1753. *Ptelea foliis simplicibus* Plum. *op. secund. cit. tab.* 247, *f.* 2.[2]

The synonymy for *Dodonaea viscosa* proper is exceptionally large and must be omitted here for the most part. It was treated in great detail by Radlkofer in Martius' Flora Brasiliensis (13, pt. 3: 639–645. 1900). The combination *D. viscosa* begins with Jacquin (*loc. cit.*). Jacquin gave no detailed description, but cited the Sloane plate 162, *f.* 3 (above listed). If we stop with the Sloane figure, as those who cite only Jacquin for the authorship of *D. viscosa* apparently do, we fix the type of the species proper as a Jamaica plant with leaves fairly large (and not very numerous), spatulate to broadly oblanceolate, apically obtuse to rounded, and very distinctly veined.

However, there is every reason to believe that Jacquin merely adapted the trivial name *viscosa* from *Ptelea viscosa* L. (*vide supra*).[3] This being the case, we may trace the Linnaean concept directly to Hortus Cliffortianus p. 144. There the first reference given is to *Staphylodendron foliis lauri angustis* Plum. Cat. 18. This reference to Plumier's Catalogue is supported only by the heading to the list of names among which it stands (in Plumier's Catalogue), and from this heading we learn that the plant had been described and delineated by Plumier himself in the "Insulis Americanis." His delineations appeared later in fascicle 10 of his large work on American plants, edited by Burmann (*vide supra*), and in figure 2 of plate 247 of that work we come to an illustration that, with better claim than

[1] For an earlier paper on *Dodonaea*, *vide* Amer. Journ. Bot. 32: 202–214. 1945.

[2] A conspectus of the varieties and formae of *Dodonaea viscosa* treated in this article will be found beginning on page 308.

[3] Indeed, many authors, Bentham among them, have ignored Jacquin altogether and accredited the combination *D. viscosa* entirely to Linnaeus.

the Sloane sketch, may serve as the type basis for *Dodonaea viscosa* in its narrowest sense. The spray shown has only five leaves. These are less or indeed not at all narrowed toward the base, the two largest being *one narrowly and one moderately* oblong. All are somewhat acute or acutish at the apex. The latter of these two oblong leaves is identically the broad kind characteristic of the forma *repanda* described by Radlkofer (*loc. cit.*) and based by him upon *Dodonaea repanda* Schum. & Thonn. Beskr. Guin. Pl. *in* Danske Vidensk. Selsk. Afhandl. III: 214 (seors. impr. p. 194), no. 1. 1828.[1] Radlkofer described the forma *repanda* so as to include *not only the very form shown in the Plumier plate but the one shown in Sloane's.* Moreover, he cited these two illustrations for f. *repanda* but somewhat guardedly with the abbreviation *"cf."* In nature, the two vary so much that, rather than employ a lesser rank of subforma for each, we might well leave them together as constituting a highly variable forma, namely, f. *repanda.*

Several varieties have been proposed for *D. viscosa,* but apparently the first one described intentionally as representing the typical form of the species was var. *vulgaris* Benth. Fl. Austral. 1: 476. 1863.

Bentham made an exhaustive study of the forty or more species of *Dodonaea* known in his day and found that most of the extra-Australian forms were referable to his *D. viscosa* var. *vulgaris* or to one or the other of two other varieties that he established for *D. viscosa,* viz., vars. *angustifolia* and *spatulata.*[2] He excepted "perhaps, the *D. eriocarpa* from the Sandwich Islands, *D. Thunbergiana,* Eckl. and Zeyh., from S. Africa, and one or two Mexican ones, which, whether varieties or species, do not occur in Australia." Bentham remarked upon the "almost protean forms the species assumes in Australia" and added that they "are very difficult to distribute into definite varieties."

In 1900 appeared the exceptionally able and brilliant treatment of *D. viscosa* by Radlkofer, already cited. Radlkofer (p. 646) accepted Bentham's three varieties, but listed only vars. *vulgaris* and *angustifolia* for Brazil, with the flora of which he at that time was concerned exclusively. He subdivided var. *vulgaris* into three formae for Brazil,

[1] This leaf is shown somewhat apart from the other four and arises from a main branch *on a side shoot of which* the other four are borne. The artist superimposed a large fruiting cluster above much of it and thus possibly some earlier workers have overlooked or ignored it. Fortunately, however, fully enough of its median and lower blade is shown to make identification certain.

[2] Bentham's spelling was *spathulata,* but the original spelling by Sir James E. Smith, from whom he derived the name, was *spatulata.*

viz., *repanda* (Schum. & Thonn.) Radlk., *Schiedeana* (Schlecht.) Radlk., and *Burmanniana* (Schum. & Thonn.) Radlk. Var. *angustifolia* he left intact.

Like Bentham, he had been impressed with the extreme polymorphism in *D. viscosa*. Thus he wrote: "Miro modo ludit forma et magnitudine foliorum fructuumque. Varietates 3 cum cl. Bentham (in Fl. Australiensi) discernere par est, α *vulgarem*, β *angustifoliam*, γ *spathulatam*, quae formas varias alias in alias transeuntes includunt. E Brasilia non nisi var. α et β et formae sequentes [*repanda*, *Schiedeana*, et *Burmanniana*] innotuerunt." Radlkofer's nomenclature, based as it was on rules since altered by international congresses, has been found to need revision. The required changes have recently been published (Amer. Journ. Bot. 32: 214. 1945) and the detailed explanations pertaining thereto are given in the present paper. Radlkofer's general understanding of the plant entities themselves, however, is seen to have been so trustworthy that we may well commence here an interpretation of *D. viscosa* with an abridged translation of his description and conspectus of *D. viscosa* vars. *vulgaris*, including its component formae, and *angustifolia*. Of necessity, these were more or less arbitrary. He described *D. viscosa* collectively as: Slender trees 3–5 meters tall or branched shrubs 1–3 meters tall. Branches erect, the floriferous ones 2–3 mm. thick, bark brown or dark. Leaves (petiole 0.2–1 cm. long included) now up to 12 cm. long, 4 cm. wide (f. *repanda*), now up to 15 cm. long, only 2 cm. wide (f. *Schiedeana*), now 7–10 cm. long, 1.5–2 cm. wide (f. *Burmanniana*), now 7–9 cm. long, 0.5–1 cm. wide (var. *angustifolia*). Thyrses subequal to half the foliar length, longer in fruit; pedicels at anthesis 0.5–0.8 cm. or in fruit 1–1.5 cm. long. Flowers 3 mm. long, whitish-green. Sepals 3 mm. long, 1.5 mm. wide, 3-nerved, puberulous especially at margin and apex. Stamineal filaments scarcely 1 mm. long, anthers 2.5 mm. long. Capsule now larger, suborbicular (its wings subequal to the locules in width included), 2.2 cm. long, 2.5 cm. wide; now mediocre, obcordate, 1.5 cm. long and 1.8 cm. wide; now small, about 1 cm. in diameter, sanguineous when fresh, in dry state brownish or stramineous. Seeds about 2.5 mm. across.

Of considerable additional aid to the student of *D. viscosa* are the short, summarizing descriptions that Radlkofer gave (*op. cit.* 646). These are repeated essentially as he presented them:

Var. α **vulgaris** Benth.: Folia sat larga, subobovata, ex oblongo latiuscule vel elongate vel anguste lanceolata, vel ex oblongo-lance-

olata cuneato-attenuata; capsula suborbicularis vel obcordata sat magna.

Forma 1. **repanda.** . . . Folia maxima ex oblongo latiuscule lanceolata utrinque acuta vel apice obtusa, inde subobovata; fructus plerumque maximi, suborbiculares, 3-alati vel 2-alati quoque in eadem inflorescentia. . . .

Forma 2. **Schiedeana.** . . . Folia longissima, elongate lanceolata, utrinque sensim acutata; fructus sat magni, orbiculares vel subobcordati, utrinque vel apice tantum emarginati, sinu apicali saepius largiore. . . .

Forma 3. **Burmanniana.** . . . Folia mediocria, ex oblongo anguste lanceolata cuneatave, apice acuta vel obtusiuscula, in petiolum longius breviusve attenuata; fructus mediocres, suborbiculares, apice et basi excisi vel subobcordati, basi vix excisi. . . .

Var. β **angustifolia** Benth.: Folia angusta, lineari-lanceolata vel sublinearia, longiora vel breviora; fructus minores, utrinque vel apice tantum excisi, alis saepius latioribus. . . .

Some years ago, I was invited by Mr. Otto Degener, well-known authority on the Hawaiian Island flora, to determine the numerous collections of *Dodonaea* that he had made in the Hawaiian Islands. I accepted the task but I soon found that it necessitated a comparative study of a vast amount of material from other regions of the earth. Several American and European herbaria cooperated by lending all or part of their *Dodonaea* material, and assistance and encouragement were given from time to time by their custodians, especially by Dr. Albert C. Smith, Curator of the Herbarium of Arnold Arboretum. It is a pleasure to acknowledge here my indebtedness to these institutions and botanists.

As the specimens of *Dodonaea viscosa* in herbaria have been observed to have been only too often misdetermined, or else undetermined to the proper variety or forma, I have had occasion to label many hundreds in accordance with the nomenclatural results of the present study. Many of these are cited later in this paper, but some of those determined for Radlkofer's three formae of var. *vulgaris* Benth. are listed here for the aid they may afford to other workers:[1]

[1] The following abbreviations are used for the depositories of specimens cited in this paper: Arn., Arnold Arboretum, Jamaica Plain; Bail., Herbarium of Liberty Hyde Bailey, Ithaca; Berl., Berlin Botanical Garden; Bish., Bernice P. Bishop Museum, Honolulu; Calif., University of California, Berkeley; Carn., Carnegie Museum, Pittsburgh; Chi., Field Museum of Natural History, Chicago; Corn.,

Specimens examined for f. 1. *repanda* (Schum. & Thonn.) Radlk.:[1]

Florida: *Otto Frank*, Pinellas, December, 1899, to April, 1900 (N.Y.); *Frederick L. Lewton*, Disston City, August 5, 1894 (N.Y.); *Harold N. Moldenke* 3576, in hammock, Miami, December 24, 1927 (N.Y.); *John K. Small* 10421, coastal sand-dunes west of Cat Point, April 23, 1922 (Gray; N.Y.).

Clarion Island: *John T. Howell* 8363 *pro parte*, Sulphur Bay, March 23, 1932 (N.Y.).

Baja California: *Marcus E. Jones*, trail down the Lagunas, west side, September 24, 1930 (Calif., *sub nom. D. lagunensi* M.E.J.); *Jones*, Cayuca Ranch, Loreto, October 23, 1930 (N.Y., *sub nom. D. lagunensi* M.E.J.); *Nelson & Goldman* 7438, shrub 10–20 feet tall, alt. 3,000–4,500 feet, road from San Bernardo to Sierra La Laguna, January 21, 1906 (Gray).

Nuevo León: *C. H. & M. T. Mueller* 335, Diente Canyon, mountains near Monterey, July, 1933 (Chi.).

Hidalgo: *V. H. Chase* 7401, alt. 5,000 feet, mountain ravine, Jacala, July 10, 1939 (Chi.; N.Y.).

Guanajuato: *Alfredo Dugès*, City of Guanajuato and vicinity, April, 1898 (Gray).

Guerrero: *Ruth Q. Abbott* 179, small tree or shrub, native name *chapulixtle*, Taxco, December 23, 1936 (Gray); *Abbott* 220, small tree or shrub, very common, Taxco, June 14, 1937 (Gray).

Cornell University, Ithaca; Deg., Herbarium of Otto Degener (until recently of Honolulu); Del., Delessert Herbarium, Geneva; Flor., Institute of Botany of University of Florence; Goth., Arboretum (or Botanical Garden) of Gothenburg; Gray, Gray Herbarium of Harvard University, Cambridge; Kew, Royal Botanical Gardens, Kew; Len., Botanical Garden of Leningrad (*Hortus Petropolitanus*); Minn., University of Minnesota, Minneapolis; Mo., Missouri Botanical Garden, St. Louis; Mun., Botanical Museum of Munich; Mus. V., Natural History Museum of Vienna; N.Y., New York Botanical Garden; Par., Museum of Natural History, Paris; Penn., University of Pennsylvania, Philadelphia; Phila., Academy of Natural Sciences, Philadelphia; U.S., United States National Museum, Washington, D.C.; U.V., University of Vienna; Yunck., Herbarium of Dr. Truman G. Yuncker, Greencastle, Indiana.

[1] Radlkofer (*op. cit.* 646) cites also the State of Maranhão, Brazil, for f. *repanda*, although no authentic specimen of f. *repanda* from that state has been available to me.

It may be noted here that f. *repanda* is the f. *typica* of certain later writers (*e.g.*, Robinson, Fl. Galapagos Isls., Proc. Amer. Acad. 38: 171. 1902; Herter, Rev. Sudam. Bot. 5: 35. 1937). We may note, too, that Otto Kuntze published (Rev. Gen. Pl. 1: 143. 1891), prior to Radlkofer's establishment of the forma *repanda*, the names *viridula* ("1. viridula O. Ktze. Flos viridulus antheris albis. Java, in Strandnähe") and *lilacina* ("2. lilacina O. Ktze. Flores apice lilacini. Silla de Caracas") for specimens of *D. viscosa* var. *vulgaris*. However, Kuntze used these names loosely, omitting formal assignment of definite rank, so that they remain of uncertain status and cannot invalidate the name *repanda* for the rank of a forma.

British Honduras: *William A. Schipp* 494, height 6 feet, trunk diameter 2 inches, along sea-beach, Stann Creek, December 9, 1929 (Calif.; Chi.; Gray; N.Y.).

Guatemala: *Alexander F. Skutch* 1005 *p. p.*, alt. 6,800 feet, on bushy mountain side, San Miguel Acatan, Dept. Huehuetenango, August 18, 1934 (Chi.); *Paul C. Standley* 82390, shrub 1–1.5 meters tall, sandy river-bed, alt. *circ.* 1,780 meters, Río Pucal, *circ.* 14 km. south of Huehuetenango, January 4, 1941 (Chi.).

Honduras: *M. A. Carleton* 619, Puerto Cortez, August 15, 1924 (Gray); *Paul C. Standley* 53038, shrub 5 feet tall, in thicket along beach, vicinity of Tela, Dept. Atlántida, December 14, 1927, to March 15, 1928 (Chi.); *Percy Wilson* 13, sandy soil between Highland Creek and sea, Puerto Sierra, January 15, 1903 (N.Y.).

Nicaragua: *Charles L. Smith* 92, shrub 4–7 feet tall, vicinity of San Juan del Norte (Greytown), November 25, 1895 (Gray; N.Y.).

Costa Rica: *Fernando Solis R.*, no. 557, alt. 50 meters, La Barra, February 5, 1939 (Chi.).

Panama: *V. C. Dunlap* 480, small tree along beach, Bar Mouth, Changuinola Valley, Prov. Bocas del Toro, March 2, 1924 (Chi.).

Colombia: *I. F. Holton*, Choachí, January 18, 1854 (N.Y.).

Venezuela: *H. Pittier* 24, native name *chaparro*, on dry hills, Avila, March, 1937 (Chi.); *Llewelyn Williams* 12305, shrub, alt. 800 meters, common the whole length of old highway between Caracas and La Guaira, Distr. Fed., January 4, 1940 (Chi., 2 sheets); *Williams* 12369, shrub up to 8 dm. tall, among low shrubs on dry and exposed slopes, alt. up to 2,200 meters, El Picacho de Galipan, Distr. Fed., January 8, 1940 (Chi.).

French Guiana: *Mélinon*, Maroni, 1877 (Chi.).

Brazil: *Blanchet* 657, vicinity of Bahia, 1831 (N.Y.); *H. M. Curran* 631, Nova Friburgo, State of Rio de Janeiro, December 9, 1918 (Chi.; N.Y.); *Francis Drouet* 2507, shrub up to 2 meters tall, on upper beaches, Barro do Ceará, Municipio de Fortalya, State of Ceará, September 25, 1935 (Chi.; Gray; N.Y.); *George Gardner* 5978, Brazil, 1836–1841 (N.Y.); *Martius* 397, Brazil (Gray; N.Y.).

Bolivia: *Otto Kuntze*, alt. 2,000 meters, Tunari Mountains, April, 1892 (N.Y.).

Bermuda: *J. W. Harshberger*, limestone sinks, Walsingham, June 16, 1905 (Gray; U.S.).

Cuba: *N. L. Britton* 2145, sand dunes, Conde Beach, Guantanamo Bay, Prov. Oriente, March 17–30, 1909 (N.Y.; U.S.); *N. L. &*

E. G. Britton & J. F. Cowell 12493, coastal thicket, Punta Piedra, Nipe Bay, Prov. Oriente, March 7, 1912 (Chi.; N.Y.; U.S.); *C. Wright* 2173, sea-shore, Cuba, 1860–1864 (Gray).

Haiti: *H. H. Bartlett* 17432, small tree, Bayeaux, June 16, 1941 (U.S.); *E. L. Ekman* 2603, on the beach, November 21, 1924 (N.Y.); *Emery C. & Genevieve M. Leonard* 13812, shrub 5 feet tall, on beach of Bord de Mer, vicinity of Jean Rabel, March 11, 1929 (Gray; U.S.); *Leonard & Leonard* 15351, shrub 5 feet tall, beach west of harbor, vicinity of La Vallée, Tortue Island, May 4, 1929 (N.Y.; U.S.); *George V. Nash* 149, small tree, along shore, Bayeux, near Port Margot, August 5, 1903 (Chi.; N.Y.).

Santo Domingo: *W. L. Abbott* 2564, small tree, near sea level, Jovero, February 1–7, 1923 (U.S.); *Eggers* 2609, *in fruticetis maritimis* at Puerto Plata, June 22, 1887 (N.Y.; U.S.); *James A. Faris* 542, low tree, 8–12 feet tall, sandy beach, Isl. Santo Domingo, September, 1921 (U.S.); *Miguel Fuertes* 317, alt. 250 meters, Barahona, June, 1910 (Chi.; Gray; N.Y.; U.S., 2 sheets).

Puerto Rico: *N. L. Britton & J. F. Cowell* 1543, shrub 2.5 meters tall, in coastal thicket, Cataño, February 14, 1914 (N.Y.; U.S.); *Mary J. Fisher* 17 (U.S.); *A. A. Heller* 4507, alt. 10 feet, along the beach, near Mayagüez, February 3, 1900 (Chi.; Gray; N.Y.; U.S.); *W. E. Hess & F. L. Stevens* 4886*A*, Boqueron, November 12, 1913 (N.Y.); *Brother Hioram*, Palo Seco, October, 1912 (N.Y.); *J. R. Johnston* 722, Mameyes, December 5, 1912 (N.Y.); *J. I. Otero* 448, Cabo Rojo, Distr. Bayamon, January 23, 1938 (Chi.); *F. H. Sargent A*28, shrub, on beach, Mayagüez, May 22, 1937 (U.S.); *P. Sintenis* 108, sea-shore at Guanajibo, Mayagüez, October 27, 1884 (Gray; U.S.); *F. L. Stevens* 2434, Patillas, June 22, 1913 (N.Y.); *J. A. Stevenson & J. R. Johnston* 1352, Cataño, February 19, 1914 (U.S.); *L. M. Underwood & R. F. Griggs* 179, sandy sea-shore, June 20, 1901 (N.Y.; U.S.).

Jamaica: *R. C. Alexander*, Port Royal Mountains, April, 1850 (N.Y.); *E. Campbell* 6052, Port Henderson, August 23, 1895 (N.Y.); *Mr. March* 1335 (Gray).

Grand Cayman: *Charles F. Millspaugh* 1264, Georgetown, February 12–15, 1899 (Chi.).

St. Martin: *I. Boldingh* 2504, in 1906 (N.Y.).

Marie Galante: *Père Duss* 3627, on sands near sea's edge, between Saint Louis and Grand Bourg, April 19, 1895 (N.Y.; U.S.).

St. Thomas: *Baron Eggers*, along the shore, Longbay, August, 1880 (Gray); *Eggers*, July, 1881 (U.S.).

Martinique: *Père Duss* 368, pretty shrub, sands at sea-shore, Diamant, 1880 (Chi.; N.Y.; U.S.).

Grenada: *W. E. Broadway*, small tree along sea-shore, February, 1905 (Chi.; Gray; N.Y.).

Trinidad: *W. E. Broadway* 8996, shrub at sea-shore, Icacos, December 3, 1929 (N.Y.).

Tanganyika Territory: *H. J. Schlieben* 4394, shrub or small tree, very frequent, lower edge of forest zone, alt. 1,800 meters, south side of Kilimanjaro, December 29, 1933 (Chi.); *Stolz* 82, Nyassa District, Kondeland, 1900 (Arn.).

Yunnan Province, China: *G. Forrest* 11234 (Arn.; Calif.); *Camillo Schneider* 2212, alt. *circ.* 2,800 meters, valley of Yangtze River near Taku toward Chungtien, August, 1914 (Arn.).

Philippine Islands: *Adduru* 8 *pro parte*, shrub 2 meters tall, at sea-shore, vicinity of Peñablanca, Cagayan Province, Luzon, May 1–June 18, 1917 (Chi.); *E. B. Copeland* 351, Davao, Distr. Davao, Mindanao, March, 1904 (N.Y.); *P. Cortes & M. D. Knapp* (*Forestry Bur. no.*) 23946, Panay, Prov. Capiz, May and June, 1915 (Arn.); *A. D. E. Elmer* 10452, Cagayan, Distr. Cagayan, Mindanao, April, 1909 (Arn.); *Elmer* 10452*a*, same place and date (Chi.); *Elmer* 12179, Magallanes (Mount Giting-giting), Sibuyan, Prov. Capiz, April, 1910 (Arn.; Chi.; Gray); (*distrib. of*) *Elmer* 16760, Irosin, Trosin (Mount Bulusan), Prov. Sorsogon, Luzon, July, 1916 (Arn.; Calif.; Chi.); *F. W. Foxworthy* 629, Palawan, March & April, 1906 (Gray; N.Y.); *H. Hallier* 231, years 1903 and 1904 (N.Y.); *Elmer D. Merrill* (*species Blancoanae n.*) 601, Tayabas Province, Luzon, March, 1914 (Chi.; N.Y.); *Merrill* 934, Caguray, Mindoro, April, 1903 (Gray; N.Y.); *Merrill* 2402, Pola, Mindoro, May, 1903 (N.Y.).

Guam: *Guam Experiment Station* 328 (N.Y.; U.S.); *R. C. McGregor* 460, October, 1911 (N.Y.; U.S.).

British North Borneo: *Mail* 3647, tree 21 feet tall, girth 12 inches, at Tg. Peras, native name *tukil-tukil bini*, September 17, 1933 (Arn.); *D. D. Wood* 1747, Balambangan Isl., May, 1923 (Arn.; Calif.).

Java: *Dr. Kollmann* 1838 (N.Y.).

Molucca Islands: *Hugo Curran* 327, on beach, 5 meters tall, Manipa Isl., May 5, 1940 (Arn.); *C. B. Robinson* 1 (representing "*Caryophyllaster litoreus*," Rumphius Herb. Amboinense 4: 110, *tab.* 50), Amboina, July–November, 1913 (Gray; N.Y.; U.S.).

Papua (New Guinea): *L. J. Brass* 866, at coast, large bush or small tree, common along foreshores, Port Moresby, December 30,

1925 (Arn.); *Brass* 1612, common name *lelechi*, Bomgwina, January 6, 1926 (Arn., 2 sheets); *Brass* 4711, tree 3–4 meters tall, alt. 2,840 meters, Murray Pass, Wharton Range, Central Division, June–September, 1933 (Arn.; N.Y.); *Brass* 6418, tree 3–5 meters tall, coast between Oriomo and Fly rivers, March 31, 1936 (Arn.); *Brass* 11397, sometimes in pure stands, up to 20 meters tall, trunk diameter up to 0.4 meter, alt. 2,200 meters, Bele River, 18 km. northeast of Lake Dabbuna, Dutch New Guinea, November, 1938 (Arn.; apparently a race or subforma of f. *repanda* growing to a colossal size and with leaves approaching some of those on Brass's material of f. *Schiedeana*); *Clemens* 5626, alt. 9,000 feet, Morobe Distr., March, 1937 (Arn.).

Bismarck Archipelago: *J. H. L. Waterhouse* 327, Gazelle Peninsula, October, 1934 (N.Y.).

Solomon Islands: *S. F. Kajewski* 2458, native name *ingele*, small tree up to 5 meters tall, at sea-level, in rain-forest, Berande, Guadalcanal Isl., January 16, 1931 (Arn.).

New Hebrides: *S. F. Kajewski* 120, shrub *circ.* 2 meters tall, in rain-forest, alt. 150 meters, Lenakel, Tanna Isl., June 3, 1928 (Arn.; N.Y.).

New Caledonia: *Balansa* 157, years 1868–1870 (Arn.); *Balansa* 2268, years 1868–1870 (Arn.); *I. Franc*, Prony (Arn.; U.S.).

Fiji Islands: *A. C. Smith* 1284, slender tree 3 meters tall, native name *usi*, Kambara, March 2–7, 1934 (Calif.; Gray; N.Y.; U.S.).

Samoa: *Erling Christophersen & E. P. Hume* 2364, alt. ±100 meters, shrub 1.5 meters tall, Manase Plantation, Isl. Savali, August 13, 1931 (Calif.; N.Y.); *Dr. Reinecke* 356, Savaii Isl., June, 1894 (U.S.); *United States Exploring Expedition* (U.S.); *F. Vaupel* 293, above Manase, June 23, 1905 (U.S.).

Society Islands: *United States Exploring Expedition*, 1838–1842 (N.Y.); *U. S. Explor. Exped.*, Isl. Tahiti (Gray; U.S.).

Australia: *C. E. Hubbard* 3478, in white sand, Hercules Bank, mouth of Brisbane River, Queensland, July 28, 1930 (Arn.); *Hubbard* 4448, on sand hills, Fraser Isl., Queensland, October 10–15, 1930 (Arn.); *J. H. Maiden & J. L. Boorman*, Norfolk Isl., New South Wales, November, 1902 (Gray); *Rev. N. Michael* 138, Flying-fish Point, North Queensland (Gray); *C. T. White* 6906, Hercules Bank, mouth of Brisbane River, July 27, 1930 (Arn.; N.Y.).

Specimens examined for f. 2. *Schiedeana* (Schlecht.) Radlk.:[1]

[1] Radlkofer (*op. cit.* 647) cites also the states of Bahia, Rio de Janeiro, and São Paulo, Brazil, for f. *Schiedeana*.

Mexico: *G. Bossé* 8370, at Lago Coapilla and on road to Santa Rita, State of Chiapas, January 18, 1926 (Chi.); *George L. Fisher* 35441, tree 20 feet tall, alt. 2,306 meters, Tepoztlan, State of Morelos, July 14, 1935 (Chi.; N.Y.); *T. C. Frye & E. M. Frye* 3132, growing 6–12 feet tall, about 5 km. north of Taxco, State of Guerrero, January 17, 1941 (Calif.); *George B. Hinton* 4869, shrub 1.5–5 meters tall, native name *chapulixtle*, alt. 2,400 meters, Cajones la Angostura, Distr. of Temascaltepec, State of Mexico (Chi.); *Hinton et alii* 8974, shrub 4 meters tall, in lower oak belt, on hill, Rincón, same district, March 11, 1936 (Gray); *Liebmann* 2193, Rio de las Vueltas, May, 1842 (Chi.); *L. H. MacDaniels* 300, shrub 6–8 feet tall, alt. 5,500 feet, in fields along the Mexico City-Cuernavaca Road near Cuernavaca, State of Morelos, August 28, 1935 (Chi.); *E. W. Nelson* 6955, Volcán de Jorullo, State of Michoacán, March, 1903 (Gray); *J. N. Rose & Joseph H. Painter* 6955, Cuernavaca, September, 1903 (N.Y.); *Rose, Painter, & J. S. Rose* 8797 *p. p.*, Pachuca, State of Hidalgo, July, 1905 (Chi.; Gray); *Caec. & Ed. Seler* 403, near Hochi, Distr. Cuernavaca, State of Morelos, December, 1887 (Gray); *Seler & Seler* 649, near Huejutla, State of Hidalgo, May, 1888 (Gray); *Seler & Seler* 4253, mountain slope, Distr. Hidalgo, State of Guerrero, May 18, 1904 (Gray); *Seler & Seler* 4435, Hacienda de Los Arcos, Zultepec, December 20, 1904 (Gray); *G. Woronow* 2823, Rio Zumpimito near Uruapan, State of Michoacán, January 21, 1926 (Chi.).

British Honduras: *Percy H. Gentle* 1775, Sibun River, Yucatan Peninsula, January 10, 1936 (N.Y.).

Guatemala: *W. A. Kellerman* 7627, alt. 1,500 feet, San Augustine, Sierra de las Minas, Dept. Baja Verapaz, January 12, 1908 (Chi.); *Julian Steyermark* 31292, shrub 20 feet tall, on dry, rocky glade slopes, alt. 1,200–1,500 meters, 3 miles southeast of Quezaltepeque, along Río Lucía Saso, vicinity of Montaña Cebollas, Montaña Castilla, Dept. Chiquimula, November 6, 1939 (Chi.).

Peru: *J. Soukup* 782, January, 1938 (Chi.).

Bolivia: *R. S. Williams* 190 *p. p.*, bush, alt. 4,800 feet, Apolo, July 20, 1902 (N.Y.).

Isle of Pines (West Indies): *A. H. Curtiss* 263, near Nueva Gerona, January 1–February 4, 1904 (Chi.; Gray; N.Y., 2 sheets; U.S.).

British East India: *A. Saulière* 40, Kodaikanal Station, Pulney Hills, Madura District, Presidency of Madras, 1914 (N.Y.).

Timor: *Boscharchitect Koepang* 16, alt. 1,300 meters, April 10, 1935 (Arn.).

Papua (New Guinea): *L. J. Brass* 5053, tree 3–6 meters tall, alt. 2,400 meters, May–September, 1933 (Arn.; N.Y.); *M. S. Clemens* 475, in open woods, 10 feet tall, alt. 2,500 feet; on hills, below Sattelberg, Morobe District, October 17, 1935 (Arn.); *Clemens* 4745, in open woods, alt. 5,000–5,500 feet, vicinity of Ogeramnang, Morobe District, December 24, 1936 (Arn.); *R. Schlechter* 19118, woods in Tinisterre District, Kaiser-Wilhelmsland, January 17, 1909 (Arn.; Chi.; U.S.).

Specimens examined for f. 3. *Burmanniana* (Schum. & Thonn.) Radlk.:

Mexico: *H. H. Bartlett* 10737, La Morita, vicinity of Marmolejo, Sierra de San Carlos, State of Tamaulipas, August 1, 1930 (Chi.; Gray); *Mary Taylor Edwards* 736, Jacala, State of Hidalgo, August 11, 1937 (Chi.); *G. M. Emrick* 109, Ostula, State of Michoacán, November, 1906 (Chi.); *Emrick* 214, Hacienda Coahuayula, State of Michoacán, February, 1901 (Chi.); *Dwight R. Furness*, Guanajuato (Chi.); *Howard Scott Gentry* 4276, slender shrub 1–3 meters tall, on open, rocky hill-slopes, in oak forest, alt. 4,000–5,000 feet, Cerro de la Giganta, Baja California, March 1, 1939 (Gray); *George B. Hinton* 295, shrub, Rincón, Distr. Temascaltepec, State of Mexico, February 22, 1932 (Gray); *Hinton* 10307, shrub 3 meters tall, San Antonio, Distr. Montes de Oca, State of Guerrero, 1937 (Chi.; N.Y.); *Hinton et alii* 11712, shrub 3 meters tall, on hill, San Antonio, same district, December 23, 1937 (Gray); *E. W. Nelson* 6087, Cerro la Silla, near Monterey, State of Nuevo León, March 20, 1902 (N.Y.); *Nelson* 6955, shrub 6–12 feet tall, Volcano Jorullo, State of Michoacán, March 28, 1903 (Gray); *Brother Nicolás*, Noria, State of Puebla, February (Chi.); *Nicolás* 5711, precise locality not stated, but collected somewhere in same state, *i.e.*, Puebla, December 15, 1910 (N.Y.); *Cyrus Guernsey Pringle* 3461, San José Pass, State of San Luis Potosí, July 23, 1890 (Chi.); *J. N. Rose* 2406, near San Juan Capistrano, State of Zacatecas, August, 1897 (Gray; N.Y.); *J. N. Rose, Joseph H. Painter, & J. S. Rose* 8797 *p. p.*, Pachuca, State of Hidalgo, July, 1905 (N.Y.); *H. W. Von Rozynski* 282, near Nogales, Jaumave, State of Tamaulipas, 1932 (Chi.; N.Y.); *Von Rozynski* 398, Jaumave, July, 1932 (Chi.; N.Y.); *Von Rozynski* 706, sierra near Victoria, Jaumave, 1932 (N.Y.); *H. H. Rusby* 110, State of Oaxaca, July 16, 1910 (N.Y.); *Caec. & Ed. Seler* 45, near Fortaleza de Mitla, Distr. Tlacolula, State of Oaxaca, June, 1888 (Gray); *Seler & Seler* 1525, above El Porian to the lower slopes of Cuauhtlillo, State of Oaxaca, November 27 and 28, 1895 (Gray,

where determined for this forma by Radlkofer); *Charles L. Smith* 824, alt. 5,500–6,000 feet, Monte Alban, near Oaxaca City, State of Oaxaca, September 5, 1894 (N.Y.); *Rev. Lucius C. Smith* 864, alt. 6,500–7,000 feet, hills of Telixtlahuaca, State of Oaxaca, October 18, 1895 (Gray).

British Honduras: *H. H. Bartlett* 11291, shrub 8 feet tall, on pine ridge, Cornhouse Creek, Manatee River, Belize District, January 31, 1931 (N.Y.).

Guatemala: *W. A. Kellerman* 7480, Los Amatos, Dept. Izabal, February 15, 1908 (Chi.; N.Y.); *Alexander F. Skutch* 1005 *p. p.*, alt. 6,800 feet, San Miguel Acatan, Dept. Huehuetenango, August 18, 1934 (N.Y.); *Paul C. Standley* 62579, shrub 4–6 feet tall, abundant, in pine and oak forest, alt. *circ.* 1,800 meters, near Chalchitán, same department, January 14, 1939 (Chi.); *Standley* 62610, shrub 3–4 feet tall, common, in oak and pine forest, alt. 1,800–2,400 meters, mountains southwest of Malacatancito, same department and date (Chi.); *Standley* 65657, shrub 3–5 feet tall, abundant at 7,000 feet, on dry, rocky hillside, Sierra de los Cuchamatanes, above Chiantla, same department, February 19, 1939 (Chi.); *Julian A. Steyermark* 38305, shrub 5–8 feet tall, alt. 80–83 meters, in sand along Motagua River, between Los Amates and Quiriguá, Dept. Izabal, March 29, 1940 (Chi.).

Costa Rica: *H. E. Stork* 3158, shrub 15–20 feet tall, in open, oak forest, alt. 5,800 feet, vicinity of Santa María de Dota, San José, July 8, 1932 (Chi.); *Manuel Valerio* 1364, alt. 1,550 meters, Santa María de Dota, December 30, 1935 (Chi.).

Panama: *M. E. Terry* 1259, shrub 12–15 feet tall, alt. 5,500 feet, Salta, Boquete, Boquete District, Chiriqui Prov., January 8, 1939 (Chi.).

Colombia: *Ellsworth P. Killip* 11269 *p. p.*, shrub, Restrepo, Cordillera Occidental, Dept. El Valle, September 16, 1922 (Gray; N.Y.); *Killip & Albert C. Smith* 19765 *p. p.*, shrub 2–5 feet tall, on open hillside, alt. 2,700–3,400 meters, between Mutiscua and Pamplona, Dept. Norte de Santander, February 23, 1927 (Gray); *Francis W. Pennell* 1839, shrub, alt. 1,500–1,600 meters, on open slope, along road below Caqueza, Dept. Cundinamarca, September 7 and 8, 1917 (N.Y.).

Ecuador: *F. C. Lehmann* 4800, Oña, Cuenca (Chi.; at Gray commixed with var. *arborescens* f. *spatulata*); *Ynes Mexia* 7047, spreading shrub, common, 1 meter tall, native name *chamana*, on open river terrace, alt. 1,200–1,500 meters, near Banos, March 6, 1935 (Chi.).

Peru: *Sawada P.* 120, San Rafael, Huanuco, October 28, 1927 (Chi.); *H. E. Stork & O. B. Horton* 10413, shrub, very common, called *chamana*, used as mattresses for beds, the gum sticking the twigs firmly together so that they make a solid unit, alt. 1,200–2,700 meters, Surcubamba-Salcabamba Trail, Prov. Tayacaja, Dept. Huancavelica, January 14, 1939 (Calif.; Chi.); *Stork & Horton* 10784, very common, sometimes a tree 4 meters tall, alt. from 2,500 down to 2,000 meters, at confluence of Río Chincheros and Río Pampas, Prov. Andahuaylas, Dept. Apurimac, March 1, 1939 (Calif.; Chi.).

Venezuela: *A. Fendler* 2545, near Tovar Colony, 1856–1857 (Gray); *Llewelyn Williams* 10107, shrub or small, slender tree, abundant on dry, open slopes, alt. 1,530 meters, Avila, Distr. Fed., May 19, 1938 (Chi., 2 sheets; approaching f. *Schiedeana*).

Brazil: *H. M. Curran* 631, Nova Friburgo, State of Río de Janeiro, December 9, 1918 (Gray); *A. Glaziou* 52, shrub, region of Copacabana, same state, March 14, 1862 (N.Y.); *Glaziou* 14580, shrub, State of Minas Geraes, December 16, 1884 (N.Y.); *Sello* 159 (Gray); *Weddel* 131 *p. p.*, environs of Río de Janeiro, State of Río de Janeiro, 1843 (N.Y.).

Bolivia: *Otto Buchtien* 531, shrub or tree, alt. 2,100 meters, November 20, 1906 (N.Y.); *José Steinbach* 8602 *p. p.*, alt. 2,800 meters, Comarapa, Dept. Santa Cruz, November 1, 1928 (Chi.).

Chile: *Guillermo Geisse*, Tulahuen (Ovalle), 1889 (Gray).

Argentina: *W. J. Eyerdam & A. A. Beetle* 22674, tree 8–10 meters tall, in sand and gravel along stream bank, in shade of forest, alt. 600 meters, Arroyo La Cantara, Cerro de Calilegua, Prov. Jujuy, October 19, 1938 (Calif.; Gray); *Eyerdam, Beetle, & E. Grondona* 23634, shrub 1–1.5 meters tall, in alluvial deposit on high, exposed cliffs, alt. 50 meters, Cerro La Peregrina, Prov. Buenos Aires, December 11, 1938 (Calif.; Gray); *P. G. Lorentz & G. Hieronymus* 1187, in the sierra between El Rincon and Clavisan, river district of Río del Tala, Prov. de Salta, December 11, 1873 (N.Y.); *S. Venturi* 2233, shrub 2–3 meters tall, alt. 500 meters, at edge of river gorge, Dept. Cruz Alta, Prov. Tucumán, October 12, 1923 (Calif.; Chi.; Gray); *Venturi* 9473, shrub 3 meters tall, alt. 900 meters, Sierra de la Candelaria, Dept. Candelaria, Prov. de Salta, September 15, 1929 (Gray; N.Y.).

Uruguay: *W. G. Herter* 5049, in dry, exposed, clay soil, alt. 200 meters, Sierra Animas, Dept. Maldonado, September, 1929 (Gray).

Abyssinia: *W. Schimper* 705, in mountains near Dscheladscheranne, native name *dasos*, November 3, 1839 (N.Y.).

Kenya Colony: *Edgar A. Mearns* 387 *p. p.*, alt. *circ.* 2,000 meters, between Oljoro-o-Nyon and Narok rivers, June 7 and 8, 1909 (N.Y.).

Tanganyika Territory: *H. J. Schlieben* 3609, shrub 2–4 meters tall, alt. 1,400 meters, savanna hills, Uluguri Range, Morogoro District, February 27, 1933 (Arn.).

South Rhodesia: *G. M. McGregor M*73/37, on Odzani River, Umtali District, May 23, 1937 (N.Y.).

Réunion: *G. de l'Isle* 566, shrub, in 1875 (Gray; U.S.).

China (see also Hainan below): *George Forrest* 11233, Yunnan (Arn.); *Forrest* 16868, Yunnan, 1917–1919 (Arn.); *Maire* 6291 (ser. *B*), among rocks, alt. 3,200 meters, Mea hong, Yunnan, August, 1910 (N.Y.); *Peter Siméon Ten* 184, erect shrub, 1.5 meters tall, near *tie so* bridge, vicinity of Pe Yen Tsin, northwestern Yunnan, June 18, 1916 (Arn.).

Hainan: *Chun & Tso* 44503, shrub 2 meters tall, in forest, Yaichow, December, 1932–1933 (Arn.; Chi.; N.Y.); *Chun & Tso* 44637, shrub 2 meters tall, on open slope, alt. 100 feet, Yaichow, December, 1932–1933 (Chi.; N.Y.); *S. P. Ko*, shrub 3 meters tall, in woods, Po-ting to Seven Finger Mountain, Lingshin, April 23, 1932 (Chi.; N.Y.); *S. K. Lau* 74, fairly common, 1.5 meters tall, in thicket, sandy soil, 2 cm. diam., Yeung Ling Shan, Ngai District, June 13, 1932 (Arn.; Calif.; N.Y.); *Lau* 1003, fairly common, on dry, level land, in clay meadow, 1 meter tall, Nodoa and vicinity, Tan District, February 3, 1933 (Arn.; N.Y.); *Lau* 3383, abundant on dry, gentle slope, sandy soil at roadside, erect, 3 meters tall and 6 cm. diam., Chim Fung Ling near Sam Mo Watt village, Kan-en District, March 8, 1934 (Arn.); *C. I. Lei* 396, shrubs, abundant, on dry, level land, sandy soil, roadside thicket, Woh Ham Shi and vicinity, Lam Ko District, February 23, 1933 (Calif.; N.Y.); *H. Y. Liang* 62898, shrub 2 meters tall, in open thickets, sandy places near seashore, Yaichow, Kwangtung, September 5, 1933 (N.Y.); *Liang* 65071, shrub 1 meter tall, on open slopes, at Hainan, February 21, 1934 (N.Y.); *Liang* 65348, shrub 2 meters tall, in thicket, same locality, February 27, 1934 (N.Y.); *Liang* 66009, shrub 2 meters tall, same locality, December 10, 1933 (N.Y.); *C. Wang* 32893, small shrub on mountain top, Kwangtung, July 8, 1933 (N.Y.); *Wang* 36485, small shrub, at Hainan, January 12, 1934 (N.Y.).

Indo-China: *J. & M. S. Clemens* 3210 *p. p.*, common dune shrub, Tourane (Turan) and vicinity, Annam (Anam), May–July, 1927

(Arn.); *A. Pételot* 6259, Prov. of Vinh, Annam, April, 1936 (Arn.); *C. B. Robinson* 1094, Nha-trang and vicinity, Annam, March 11–26, 1911 (N.Y.).

Malaya: *A. C. Maingay* 459/2 (Gray).

British East India: *Father Anglade*, alt. 1,000–8,000 feet, Kodaikanal region, Pulney Hills, southern India (Arn.); *R. D. Anstead* 104, very common shrub "covering all the hilltops in South India," alt. 6,000 feet, Kotagiri, Nilgiri Hills, April, 1923 (Arn.); *Dr. Prain*, Coonoor, Nilgiri, February 11, 1899 (Arn.); *R. Wight*, exceedingly common in inland parts of the country, many expansive tracts of country being completely covered with it, Mysore (Kew); *E. H. Wilson*, bush 6–12 feet tall, in open country, Ootacamund, October 14, 1921 (Arn., 2 sheets).

Ceylon: *Thwaites* 1158 (Calif.; Gray).

Philippine Islands: *M. Adduru* 8 *pro parte*, shrub 2 meters tall, vicinity of Peñablanca, Cagayan Prov., Luzon, June 29, 1917 (Arn.; elsewhere, e.g. Chi., material under this number is referable to f. *repanda*).

Java: *Blume*, in garden (N.Y.).

Papua (New Guinea): *L. J. Brass & Chr. Versteegh* 10494, rare tree of secondary forest, 10 meters tall, trunk 31 cm. diam., crown fairly small, bark 1 mm. thick, alt. ±2,600 meters, 9 km. northeast of Lake Habbema, Dutch New Guinea, October, 1938 (Arn.; approaching f. *Schiedeana*); *C. E. Lane Poole* 419, on grass lands and old farm lands near Menari, alt. 5,000 feet, February, 1923 (Arn.).

Fiji Islands: *Otto Degener* 14299, shrub 5–7 feet tall, in open, scrubby forest, alt. 2,500 feet, Nandarivatu, Tholo North, Viti Levu, February 9, 1941 (Arn.); *Degener* 14332, shrub 5 feet tall, in scrub, alt. 2,500 feet, native name *osi*, same locality, February 13, 1941 (Arn.); *Degener & Ordoñez* 13537, shrub 5 feet tall, in scrub, alt. 2,600 feet, Nandarivatu, November 20, 1940 (Arn.); *Degener & Ordoñez* 13703, shrub 4–5 feet tall, alt. 30 meters, in scrub, Rakiraki, Viti Levu, December 13, 1940 (Arn.); *Degener & Ordoñez* 13710, shrub 5 feet tall, in scrub, alt. 400 feet, northwest gulch of small, jagged range north of Lomolomo, Lautoka, Viti Levu, December 5, 1940 (Arn.); *W. H. Harvey*, November, 1855 (Gray); *Albert C. Smith* 826 *p. p.*, tree 4 meters tall, on exposed cliff head, alt. 150–350 meters, hills west of Mbutha Bay, Natewa Peninsula, Vanua Levu, December 21, 1933, native name *wosi* (Gray; U.S.).

Australia: *F. T. Freney*, Cooper's Plains, near Brisbane, Queensland, November, 1920 (Arn.); *Sabine Helms* 940, shrub on dune,

peninsula north of "The Entrance," Tuggerah *via* Wyong, New South Wales, 1922 (Arn.); *C. T. White* 1849, Burleigh Heads, southeast Queensland, November, 1921 (Arn.); *White* 6349, Traverston, mouth of Burru River, Queensland, 1929 (Calif.).

Dodonaea viscosa var. *a* **vulgaris** f. 4. **eriocarpoidea** f. nov.—Ramuli ultimi hispiduli. Folia circumambitu variabilia (pro typo anguste elliptico- vel oblongo-lanceolata, utrinque acuminata, graciliter petiolata, minutissime ciliolata, 5–10.5 cm. longa et 0.8–1.7 cm. lata), saepe eis f. *Burmannianae* vel f. *angustifoliae* rarius eis f. *spatulatae* subsimilia. Inflorescentiae plus minusve hispidulae, masculinae plerumque numerosae parvae densae 1–2 cm. longae.

Ultimate branchlets hispidulous. Leaves variable in outline (those on the type narrowly elliptic- or oblong-lanceolate, at both ends acuminate, slenderly petioled, very minutely ciliolate, 5–10.5 cm. long and 0.8–1.7 cm. wide), often subsimilar to those of f. *Burmanniana* or of f. *angustifolia* or more rarely to those of f. *spatulata*. Inflorescences more or less hispidulous; staminate ones commonly numerous, small, dense, 1–2 cm. long.

Specimens examined:

Mexico: *G. Andrieux* 488, Mitla, near Oaxaca, July (Gray); *Berlandier* 929, in mountains near San Carlos, November, 1831 (Gray; N.Y.); *Berlandier* 2359, same place and date (Gray; N.Y.); *Bourgeau* 312, Santa Fé, Valley of Mexico, July 26, 1865 (Gray); *V. H. Chase* 7156, shrub 8 feet tall, north of Jacala, State of Hidalgo, June 26, 1939 (Calif.); *Hartweg* 19, Mexico (Gray); *Ivan M. Johnston* 3849, shrub 5–7 feet tall, dense, infrequent, on gravelly plain, Puerto Escondido, Baja California, May 24, 1921 (Calif.; Chi.; Gray; N.Y.); *Nelson & Goldman* 7154, shrub 10–15 feet tall, alt. 2,000 feet, Yubai, Baja California, September 18, 1905 (Calif.); *Charles R. Orcutt* 3297, Veracruz, February 16, 1910 (Chi.; Gray); *Edward Palmer* 127 and 181, Nuevo León, February and March, 1880 (Gray; N.Y.); *C. C. Parry & Ed. Palmer* 96, Mexico, 1878 (Gray); *C. A. Purpus* 3169, vicinity of San Luis Tultitlanapa, Puebla, near Oaxaca, May–July, 1908 (Calif.; Chi.; Gray; N.Y.); *J. G. Schaffner* 306, San Luis Potosí, 1879 (Calif., leaves approaching or passing into those of var. *linearis* f. *arizonica;* N.Y.); *Schaffner* 709, in mountains, San Miguelito, San Luis Potosí Valley, 1876 (type, Chi.); *Walther Schumann* 471, in mountains, Jaral, May 26, 1885 (Chi.; Gray); *Stephen S. White* 1647, low shrub, alt. about 2,500 feet, Cerro de la Silla, near Monterey, Nuevo León, June 30, 1939 (Gray).

In its strong tendency toward pubescence in the inflorescences and on the leaf-edges, this forma suggests var. *linearis* f. *arizonica*, to which it is indeed close. The leaves are mostly broader than in that forma, however, and when fairly large, as on the type, suggest small-leaved f. *Burmanniana* material. Some specimens have shorter leaves, these more spatulate and apically less acuminate to obtuse. *Orcutt* 3297, *Nelson & Goldman* 7154, and *Johnston* 3849 are such specimens.[1] Forma *eriocarpoidea* offers at times a resemblance to *Dodonaea eriocarpa* Smith and some of the many varieties, mostly Hawaiian, of that species. Its geographic range, as far as known, extends from the northern border of the State of Oaxaca northward along the eastern part of Mexico, but must include the somewhat remote localities farther west, cited for Baja California. In this latter region occur additional specimens that appear to constitute a new forma referable to a place next to f. *Ehrenbergii* under var. *arborescens* (and described below as f. *hispidula*).

Dodonaea viscosa var. β **linearis** (Harv. & Sond.) Sherff, Amer. Journ. Bot. 32: 214. 1945 et f. *linearis* Sherff *loc. cit.* *Dodonaea linearifolia* Linden Pl. Cub. num. 2070 (*annis* 1841–1846) *et apud* Turcz. Bull. Mosc. 31[I]: 407. 1858. *Dodonaea linearis* E. Mey. *in Hb.* Drège, Flora 26[II], Beigabe p. 179. 1843. *Dodonaea Thunbergiana* var. *linearis* Harv. & Sond. Fl. Cap. 1: 242, *sub num.* 2. 1859–1860.

Dodonaea viscosa has, in addition to the var. *vulgaris* f. *eriocarpoidea* just described, three more or less easily recognizable formae with proportionately narrower or more elongate leaves than is usually the case in such varieties as var. *vulgaris* and var. *arborescens*. These forms have been referred rather commonly to var. *angustifolia* Benth., mentioned above as having been retained by Radlkofer for certain Brazilian material. However, Bentham's epithet, published in 1863, was antedated for varietal status by var. *linearis* Harv. & Sond., published at least three years earlier.

Typical var. *linearis*, which may be designated (in the sense of a forma) as f. *linearis*, is found in South Africa, the West Indies (islands of Cuba and Haiti), northwestern Mexico, etc. It has linear leaves, these short (±5 cm.) or long (±7–11 cm.). Its inflorescence has the branchlets glabrous to sparsely setulose; otherwise it might be mistaken in many cases for f. *arizonica* (*vide infra*).

[1] It must be pointed out that the assignment of f. *eriocarpoidea* to var. *vulgaris* is arbitrary. It might with almost equal reason be made to var. *linearis* or to var. *arborescens*.

Specimens examined for f. 1. *linearis:*

Mexico: *Roxana S. Ferris* 8807, dominant shrub on slopes above flat, cultivated river valley, 2 miles north of Imuris on Nogales Highway, State of Sonora, March 24, 1934 (N.Y.); *H. S. Gentry* 1120, shrub 5 or 6 feet tall, in arroyo, Conejos, Río Mayo, State of Sonora, October 26, 1934 (Chi.); *E. A. Goldman* 230, near Batopilas, State of Chihuahua, October 8, 1898 (N.Y.); *C. V. Hartman* 84, shrub 6–12 feet tall, alt. 5,100 feet, Cochuto, State of Sonora, October 4, 1890 (N.Y.); *Hartman* 204, shrub 4–8 feet tall, alt. 3,450 feet, Oputo, State of Sonora, November 1, 1890 (Gray); *Ivan M. Johnston* 4319, erect shrub, single plant under palm, San Pedro Bay, State of Sonora, July 7, 1921 (Calif.; Chi.; Gray; N.Y.); *I. Knobloch* 5627, Mojarachic, State of Chihuahua, October 23, 1938 (Chi.); *Harde LeSueur*, Río Bonito, State of Chihuahua, August 25, 1936 (Chi.); *Edward Palmer* 143, Hacienda San Miguel, near Batopilas, State of Chihuahua, September, 1885 (Gray; N.Y.); *Palmer* 247, alt. 7,000 feet, mountains above Batopilas, November, 1885 (Gray); *Forrest Shreve* 6646, at 11 miles west of Cucurpe, State of Sonora, September 13, 1934 (Gray); *Rose, Standley, & Russell* 12804, Sierra de Alamos, State of Sonora, March 14, 1910 (Gray; N.Y.); *Stephen S. White* 400, shrub, about 5 miles north of Montezuma, State of Sonora, July 1, 1938 (Gray); *White* 514, small, slender shrub, Santa Rosa Canyon, near Bavispe, State of Sonora, July 15, 1938 (Gray); *Ira L. Wiggins* 6480, main canyon east of La Palma, 50 miles north of Guaymas, in Sierra Libres, State of Sonora, March 9, 1933 (Calif.; Chi.; N.Y.).

Ecuador: *A. Rimbach* 612 *p. p.*, small shrub on dry hills, alt. 2,700 meters, interandine highland near Riobamba (N.Y.).

Cuba: *Eugenio Cuesta* 1079, Prov. Pinar del Río, April, 1915 (N.Y.); *Linden* 2070 (Gray, type collection of *Dodonaea linearifolia* Linden *apud* Turcz.); *C. Wright* 3525, in 1865 (Gray).

Haiti: *L. R. Holdridge* 1009, tree about 4 meters tall, alt. 350 meters, Port au Prince, February 18, 1942 (U.S.); *E. C. Leonard* 8967, slender shrub about 12 feet tall, in dry thicket on slopes, alt. 325–900 meters, south of Ennery, Dept. L'Artibonite, January 19, 1926 (Calif.; Gray; N.Y.; U.S.); *Leonard* 8985, slender shrub up to 12 feet tall, in dry, rocky thicket near summit of mountain southeast of Ennery, January 19, 1926 (U.S.).

South Africa: *Dr. Burchell* 4900 (Gray); *J. F. Drège*, in 1843 (N.Y.); *Drège* 7532*a* (Gray; N.Y.); *L. M. Kapp*, native name

CORRECTION, MARCH 6, 1943

As will be shown elsewhere in a forthcoming publication, Swartz's citation of Murray's "Syst. Veg. 382.2" carries the Swartz species back to the L.f. basonym. Hence the correct author-citation for D. viscosa var. angustifolia is (L.f.) Benth. For the tetranomial D. viscosa var. linearis f. angustifolia, it is (L.f.) Sheriff.

untain slopes near Uniondale, District of Uniondale, 1921 (Arn.); *Otto Kuntze*, alt. 300 meters, Cog- e Colony, February 2, 1894 (N.Y.); *Macowan* 717, feet, on slopes of Nieuwe Kloof Mountains, near ber, 1886 (Gray); *F. A. Rogers* 30100, alt. 1,800 feet, Distr. Albany (Arn.); *W. A. & C. B. Setchell*, "Eisten- beyond Montague Pass on way to Oudtshoorn, Cape 11, 1927 (Calif.); *J. Thode* A1101, Enon, Cape ber, 1926 (N.Y.).

de l'Isle 627, Mount St. Denis, 1875 (Gray).

Abbé Urbain Faurie 48, on Mount Taitum, June 30, *Henry*, Takow (N.Y., 2 sheets); *Playfair* 97 (Arn.); 0975, by seashore, abundant, Bonjo to Kuram, Prov. nber 14, 1918 (Arn.).

ustralia: *J. L. Boorman*, Baan Baa, New South Wales, Novem- f.); *Fraser*, New South Wales, 1818 (Arn., 2 sheets); Mount Warrah, New South Wales, October, 1897 *White* 1720, Silverwood near Warwick, East Queensland, er, 1922 (Arn.; Calif.).

onaea **viscosa** var. β **linearis** f. 2. **angustifolia** (Benth.) Amer. Journ. Bot. 32: 214. 1945. *Dodonaea angustifolia* L. *f.* h. Pl. Syst. Veg. 218. 1781. *Dodonaea angustifolia* Swartz, Bot. 150. 1791. *Dodonaea viscosa* var. *angustifolia* Benth. tral. I. 476. 1863.

iscosa var. *angustifolia* Benth. was founded upon *D.* lia Swartz (Observ. Bot. 150. 1791), a plant inhabiting *ores* Jamaicae" (*fide Swartzii*). But the younger had already described (*loc. cit.*) a *Dodonaea angustifolia* uthern India. With both Linnaeus (*f.*) and Swartz, the nceolato-linearia." The two concepts were undoubt- and have been so regarded by numerous authors. Swartz's name was of course a homonym and, under the ional Rules (edit. 3, art. 61. 1935), was illegitimate.[1] For mparable reasons, some American authors have rejected *ustifolia*, no matter for what status it was used by ent to Swartz. It must be observed here, however,

[1] ay be "generally treated as a synonym on taxonomic grounds" *. cit.*) and still be a homonym. The essential requirement of a duplicates a name previously and validly published for a group ased "*on a different type.*"

Specimens examined for f. 1. *linearis:*

Mexico: *Roxana S. Ferris* 8807, dominant shrub on slopes a flat, cultivated river valley, 2 miles north of Imuris on Nog Highway, State of Sonora, March 24, 1934 (N.Y.); *H. S. Ge* 1120, shrub 5 or 6 feet tall, in arroyo, Conejos, Río Mayo, Stat Sonora, October 26, 1934 (Chi.); *E. A. Goldman* 230, near Batopi State of Chihuahua, October 8, 1898 (N.Y.); *C. V. Hartman* shrub 6–12 feet tall, alt. 5,100 feet, Cochuto, State of Son October 4, 1890 (N.Y.); *Hartman* 204, shrub 4–8 feet tall, alt. 3, feet, Oputo, State of Sonora, November 1, 1890 (Gray); *Ivan Johnston* 4319, erect shrub, single plant under palm, San Pedro B State of Sonora, July 7, 1921 (Calif.; Chi.; Gray; N.Y.); *I. Knobl* 5627, Mojarachic, State of Chihuahua, October 23, 1938 (Ch *Harde LeSueur*, Río Bonito, State of Chihuahua, August 25, 1 (Chi.); *Edward Palmer* 143, Hacienda San Miguel, near Batopil State of Chihuahua, September, 1885 (Gray; N.Y.); *Palmer* 2 alt. 7,000 feet, mountains above Batopilas, November, 1885 (Gra *Forrest Shreve* 6646, at 11 miles west of Cucurpe, State of Sono September 13, 1934 (Gray); *Rose, Standley, & Russell* 12804, Sie de Alamos, State of Sonora, March 14, 1910 (Gray; N.Y.); *Stephen White* 400, shrub, about 5 miles north of Montezuma, State of Sono July 1, 1938 (Gray); *White* 514, small, slender shrub, Santa R Canyon, near Bavispe, State of Sonora, July 15, 1938 (Gray); *Ir L. Wiggins* 6480, main canyon east of La Palma, 50 miles north Guaymas, in Sierra Libres, State of Sonora, March 9, 1933 (Cali Chi.; N.Y.).

Ecuador: *A. Rimbach* 612 *p. p.*, small shrub on dry hills, alt. 2,7 meters, interandine highland near Riobamba (N.Y.).

Cuba: *Eugenio Cuesta* 1079, Prov. Pinar del Río, April, 191 (N.Y.); *Linden* 2070 (Gray, type collection of *Dodonaea linearifo* Linden *apud* Turcz.); *C. Wright* 3525, in 1865 (Gray).

Haiti: *L. R. Holdridge* 1009, tree about 4 meters tall, alt. 3 meters, Port au Prince, February 18, 1942 (U.S.); *E. C. Leonard* 89 slender shrub about 12 feet tall, in dry thicket on slopes, alt. 325–9 meters, south of Ennery, Dept. L'Artibonite, January 19, 19 (Calif.; Gray; N.Y.; U.S.); *Leonard* 8985, slender shrub up to 12 fe tall, in dry, rocky thicket near summit of mountain southeast Ennery, January 19, 1926 (U.S.).

South Africa: *Dr. Burchell* 4900 (Gray); *J. F. Drège*, in 18 (N.Y.); *Drège* 7532*a* (Gray; N.Y.); *L. M. Kapp*, native na

Jjsterbosch, mountain slopes near Uniondale, District of Uniondale, Pretoria, July, 1921 (Arn.); *Otto Kuntze*, alt. 300 meters, Cogmanskloof, Cape Colony, February 2, 1894 (N.Y.); *Macowan* 717, alt. about 900 feet, on slopes of Nieuwe Kloof Mountains, near Tulbagh, October, 1886 (Gray); *F. A. Rogers* 30100, alt. 1,800 feet, Grahamstown, Distr. Albany (Arn.); *W. A. & C. B. Setchell*, "Eistenbosh" Karroo, beyond Montague Pass on way to Oudtshoorn, Cape Province, May 11, 1927 (Calif.); *J. Thode A*1101, Enon, Cape Colony, November, 1926 (N.Y.).

Réunion: *G. de l'Isle* 627, Mount St. Denis, 1875 (Gray).

Formosa: *Abbé Urbain Faurie* 48, on Mount Taitum, June 30, 1903 (Arn.); *A. Henry*, Takow (N.Y., 2 sheets); *Playfair* 97 (Arn.); *E. H. Wilson* 10975, by seashore, abundant, Bonjo to Kuram, Prov. Koshun, November 14, 1918 (Arn.).

Australia: *J. L. Boorman*, Baan Baa, New South Wales, November, 1914 (Calif.); *Fraser*, New South Wales, 1818 (Arn., 2 sheets); *J. H. Maiden*, Mount Warrah, New South Wales, October, 1897 (Arn.); *C. T. White* 1720, Silverwood near Warwick, East Queensland, September, 1922 (Arn.; Calif.).

Dodonaea viscosa var. *β* **linearis** f. 2. **angustifolia** (Benth.) Sherff, Amer. Journ. Bot. 32: 214. 1945. *Dodonaea angustifolia* L. *f.* Supplem. Pl. Syst. Veg. 218. 1781. *Dodonaea angustifolia* Swartz, Observ. Bot. 150. 1791. *Dodonaea viscosa* var. *angustifolia* Benth. Fl. Austral. 1: 476. 1863.

Dodonaea viscosa var. *angustifolia* Benth. was founded upon *D. angustifolia* Swartz (Observ. Bot. 150. 1791), a plant inhabiting "*montes frigidiores* Jamaicae" (*fide Swartzii*). But the younger Linnaeus had already described (*loc. cit.*) a *Dodonaea angustifolia* from southern India. With both Linnaeus (*f.*) and Swartz, the leaves were "lanceolato-linearia." The two concepts were undoubtedly identical and have been so regarded by numerous authors. However, Swartz's name was of course a homonym and, under the International Rules (edit. 3, art. 61. 1935), was illegitimate.[1] For this or comparable reasons, some American authors have rejected the epithet *angustifolia*, no matter for what status it was used by writers subsequent to Swartz. It must be observed here, however,

[1] A *homonym* may be "generally treated as a synonym on taxonomic grounds" (Internat. Rules *loc. cit.*) and still be a homonym. The essential requirement of a homonym is that it duplicates a name previously and validly published for a group of the same rank based "*on a different type.*"

that under the same International Rules (art. 69, examples, *sub Talino polyandro* Hook.) the illegitimacy of the name *angustifolia*[1] for the concept as held by Swartz does not invalidate its use by Bentham and subsequent workers for a varietal status. The combination *Dodonaea viscosa* var. *angustifolia* Benth., even though Bentham cited Swartz's specific binomial, "is treated, not as a new combination, but as a new name." No parenthetical citation of "Swartz" is called for, therefore, before "Benth."

Radlkofer, in his classical study of *Dodonaea*, retained the var. *angustifolia* Benth. under *D. viscosa* and redescribed its leaves as "lineari-lanceolata vel sublinearia" to include a wider range of specimens. He made no attempt to describe subordinate formae.[2] If we return to the concept as held by Bentham, however, we see that it evidently related to broader-leaved material than f. *linearis* and *was intended to include the plants with leaves varying from linear-lanceolate to linear-oblanceolate.* It is represented by *Dodonaea jamaicensis* DC. as interpreted in Britton, Fl. Bermuda 225 and illustr. 1918. The forma *angustifolia* is by far the most widely distributed and abundant forma of var. *linearis.* At times it approaches var. *vulgaris* f. *Burmanniana* and var. *arborescens* f. *spatulata.*

Specimens examined for f. 2. *angustifolia:*

Florida: *Charles Henry Baker* 547*b*, alt. ±15 feet, Volusia County, November 20, 1918 (Gray); *A. H. Curtiss* 485 *p. p.*, sand ridges between the ocean and Indian River, September (Chi.; Gray; N.Y., 2 sheets); *Francis Duckett* 236, in tropical pineland, Miami, December 6, 1933 (Calif.; Chi.; N.Y.); *A. Fredholm* 5603, hammock, Brevard

[1] We may note that N. L. Britton, who had a very extensive acquaintance with *Dodonaea* in the field for many of the West Indies islands, rejected the Swartz epithet *on numerous herbarium sheets* (in Herb. N.Y.) as "not *D. angustifolia* L.*f.*" and then in place of *D. angustifolia* Sw., used the name *D. jamaicensis* DC. Britton used also *in his publications* (*e.g.*, Fl. Bermuda 225. 1918) the name *D. jamaicensis* DC. He was undoubtedly actuated by at least two considerations: (1) Because Linnaeus *f.* and Swartz were concerned with plants from opposite sides of the earth, it might be presumed that the plants were taxonomically different; (2) Britton, in later life, was averse to recognizing nomenclaturally any entities lower than species (I rely here not only upon his published works but upon several conversations that I had with him, especially in the summer of 1913, when he was bringing to a close the revisional work incident to the second edition of Britton and Brown's Illustrated Flora [Illustr. Fl. N. U.S. etc., 3 vols. 1913]). Judging the common *angustifolia* form as seen in the West Indies to be distinguishable from *D. viscosa* in the latter's narrower sense, he wished to retain it in his botanical works. He therefore construed it as a species. He rejected the Swartz homonym and adopted the later name, *D. jamaicensis.*

[2] There was no occasion to do so, since he was concerned at the time with the Brazilian flora and since Brazil apparently was not known to produce other than the typical forma of var. *angustifolia.*

County, November 25, 1902 (Gray); *A. P. Garber*, Miami, April, 1877 (Gray); *H. J. Koehler* 47, Polk or De Soto County, 1925 (Gray); *J. B. McFarlin* 8113, Lake Jackson, July 30, 1934 (N.Y.); *Harold N. Moldenke* 514, shrub about 4.5 feet tall, grassy field near Brickell Hammock, Dade County, January 31, 1930 (N.Y.); *J. K. Small & J. J. Carter* 1480, in hammocks, Miami, October 28–November 28, 1903 (N.Y.); *Small & Carter* 2588, pinelands between Homestead and Camp Jackson, November 1, 1906 (N.Y.); *Small & Carter* 3071, pinelands, island east of Naranja, January 14, 1909 (N.Y.); *Small & Carter* 3168, pinelands, Long Key (Everglades), January 18–26, 1909 (N.Y.); *Small, Carter, & G. K. Small*, pinelands, Big Pine Key, February 27, 1911 (N.Y.); *Small, Carter, & Small* 3283, Brickell Hammock, south of Miami, February, 1911 (N.Y.); *J. K. Small & J. B. De Winkeler* 9069, sandhills east of Sebring, May 1, 1919 (N.Y.); *J. K. Small & G. V. Nash* 90, Miami, October 27–November 13, 1901 (N.Y.); *Small & Small* 4783, pinelands south of Miami River, November 26–December 20, 1913 (N.Y.); *S. M. Tracy* 7481 *p. p.*, Sanibel Isl., May 15, 1901 (Chi.; Gray; N.Y.).

Revillagigedo Islands: *A. W. Anthony* 390, Socorro Isl., March–June, 1897 (Gray); *Anthony* 412, Clarion Isl., March–June, 1897 (Chi.; Gray; N.Y.); *F. E. Barkelew* 188, San Benedicto Isl., May 27–July 3, 1903 (Gray; N.Y.); *John Thomas Howell* 8363 *pro parte*, Sulphur Bay, Clarion Isl., March 23, 1932 (Chi.; Gray); *Herbert L. Mason* 1551, top of sea-cliffs, Clarion Isl., April 26, 1925 (Gray); *Mason* 1621, Grayson's Cove, Socorro Isl., May 4, 1925 (Chi.).

Mexico: *Brother Arsène*, Cerro de Santa Maria near Puebla, State of Puebla, November 17, 1909 (N.Y.); *Arsène* 8863, alt. 2,280 meters, San Angel: Pedregal, Distr. Fed., July 3, 1913 (Chi.); *Bourgeau* 3012, Valley of Mexico, same date (N.Y.); *Dr. Coulter* 867, Zimapan, State of Hidalgo (Gray); *Leon Diquet*, barranca du Río Santiago, State of Jalisco, December, 1899 (N.Y.); *E. Langlassé* 102, shrub about 3 meters tall, forming a large forest ("forêt") in volcanic sand, alt. 1,000 meters, at foot of Volcán de Yorullo (Mount Jorullo), State of Michoacán, April 13, 1898 (Gray); *E. Lyonnet* 17, Lomas, Distr. Fed., September, 1927 (Gray; N.Y.); *E. Matuda* 2015, Santa Rita, Mapastepec, State of Chiapas, January, 1938 (N.Y., 2 sheets); *Seemann*, Sierra Madre (Gray).

British Honduras: *Percy H. Gentle* 1775, shrub, edge of pineland, Gracie Rock, Belize District, January 10, 1936 (Chi.); *M. E. Peck* 34, pine ridge near Manatee Lagoon, June 11, 1905 (Gray); *Peck* 960, same place, August 7, 1906 (Gray).

Colombia: *E. P. Killip* 11269 *pro parte*, shrub, Cordillera Occidental, Restrepo, Dept. El Valle, September 16, 1922 (N.Y.); *Killip & Albert C. Smith* 19765 *pro parte*, shrub 2–5 feet tall, open hillside, alt. 2,700 meters, between Mutiscua and Pamplona, Dept. Norte de Santander, February 23, 1927 (N.Y.).

Venezuela: *Alfredo Jahn* 807, alt. 2,700 meters, Merida, January 22, 1922 (N.Y.); *Otto Kuntze* 1631, alt. ±7,500 feet, at head of Silla River (N.Y.); *E. H. Pittier* 211, tree 2–3 meters tall, Heights of Galipan, in savanna, near Caracas, December 19, 1921 (Gray); *Padre Cornelio Vogl* 104, tree about 7 meters tall, alt. 1,500–2,400 meters, south slope of Cerro Avila, Distr. Fed., August 30, 1939 (Chi.).

Ecuador: *Ed. André K.*580, Cisne (Chi.; Gray; N.Y.); *Erica Heinrichs* 22, shrub 9 dm. tall, alt. 2,650 meters, everywhere even to 3,000 meters, stony slope on the Río Ambato, November 1, 1932 (N.Y.); *Albert S. Hitchcock* 21582, much branched shrub 2–4 feet tall, common on dry slopes in hot river valleys, often dominant, alt. 2,700–3,300 meters, between Oña and Cuenca, Prov. Azuay, September 9 and 10, 1923 (Gray); *Hitchcock* 21720, shrub 3 feet tall, common on dry slope, alt. 2,600 meters, Ambato, Prov. Tungurahua, September 21, 1923 (Gray; N.Y.); *C. William Penland & Robt. H. Summers* 77, alt. 1,750 meters, along Pastaza River at Baños, Prov. Tungurahua, March 14, 1939 (Chi., approaching var. *vulgaris* f. *repanda*); *A. Rimbach* 612 *p. p.*, small shrub, dry hills, alt. 2,700 meters, near Riobamba, 1935 (Chi.); *Rose, Pachano, & Rose* 23810, vicinity of Cuenca, September 17–24, 1918 (N.Y.); *R. Spruce* 4978, Andes Mountains, 1857–1859 (Gray; N.Y.).

Peru: *O. F. Cook & G. B. Gilbert* 737, alt. *circ.* 3,000 meters, native name, *Chamana*, Ollantaytambo, May 16, 1915 (Chi.; Gray; N.Y.); *Ryozo Kanehira* 64, Huánuco, Dept. Huánuco, January 10, 1927 (Chi.); *E. P. Killip & A. C. Smith* 21818, shrub 2–4 feet tall, in clefts of bare rock, open hillside, alt. 3,000–3,200 meters, Tarma, Dept. Junín, April 20–22, 1929 (Chi.; N.Y.); *J. Francis Macbride* 3335, common shrub on stony western slopes, alt. *circ.* 9,000 feet, Mito, April 8–18, 1923 (Chi.); *H. E. Stork & O. B. Horton* 10095, shrub 1–1.5 meters tall, in shrub-lands, clay soil, alt. 2,800 meters, native name *Chamana*, leaves mixed with coca if latter is too strong, Sucse River Valley west of Socota, Prov. Cutervo, Dept. Cajamarca, December 9, 1938 (Chi.); *C. Vargas* 474, environs of Cuzco, in clayey, rocky places, alt. 3,000 meters, Paruro, July, 1937 (Calif.; Chi.);

Vargas 475, in clayey and rocky places, vicinity of Abancay, Dept. Apurimac, August, 1937 (Chi.).

Brazil: *Claussen* 27, in 1842 (N.Y.); *Alb. Loefgren* 10386, Sorocaba, Sao Paulo, October 27, 1887 (N.Y.); *L. Riedel & B. Luschnath* 509, February–July, 1832 (N.Y.; Radlkofer, *loc. cit.* 647, puts this under var. *vulgaris* f. *Burmanniana* but it seems slightly closer to f. *angustifolia*); *Weddel* 131 *p. p.*, vicinity of Río de Janeiro, 1843 (N.Y., 2 sheets).

Bolivia: *Otto Buchtien* 93, alt. 3,300 meters, La Paz, April 10, 1901 (Gray); *Buchtien* 138, shrub 2 meters tall, alt. 2,650 meters, Cotaña, November, 1911 (Chi.; Gray; N.Y.); *M. Cárdenas* 2124, shrub 1 meter tall, on stony river-sides, alt. 2,000 meters, Mizque, Cochabamba, June, 1940 (Gray); *Cárdenas* 2845, shrub 2–3 meters tall, in rocky and very dry soil, alt. 1,600 meters, Cordillera of Tucahuasi, Dept. Santa Cruz, native name *chakatea*, August, 1934 (Chi.); *B. A. Krukoff* 10707, shrub 30 feet tall, alt. 1,500–1,600 meters, vicinity of Tajma (near Chulumani), Prov. S. Yungas, Dept. La Paz, August 26 and 27, 1939 (Chi.; N.Y.); *Otto Kuntze*, alt. 3,000 meters, Río Tapacari, March 19, 1892 (N.Y.); *G. Mandon* 772, dry places, woods, alt. 2,600 meters, Challapampa, vicinity of Sorata, Prov. Larecaja, December, 1857 to May, 1858 (Gray; N.Y.); *H. H. Rusby* 101, alt. 5,500 feet, vicinity of Canamina, July 15, 1921 (Gray; N.Y.); *José Steinbach* 8602 *p. p.*, alt. 2,800 meters, Comarapa, Dept. Santa Cruz, November 1, 1928 (Gray); *C. White*, alt. 3,500 feet, vicinity of Espia, head of Bopi River, July 22, 1921 (N.Y.); *R. S. Williams* 190 *p. p.*, bush 8 feet tall, trunk 2 inches in diam., alt. 4,800 feet, Apolo, April 15, 1902 (N.Y.).

Argentina: *S. Venturi* 8769, shrub about 2 meters tall, alt. 1,000 meters, Candelaria, Dept. Candelaria, Prov. Salta, May 26, 1929 (Gray).

Uruguay: *Guil. Herter* 701*b* (5229), 3 meters tall, in dry, stony field, alt. 100–200 meters, native name *chilca*, Pan de Azúcar, Dept. Maldonado, October, 1907 (N.Y.); *W. G. Herter* 701*c*, growing 2–3 meters tall, in dry, stony, clay soil, alt. 200 meters, Sierra Animas, Dept. Maldonado, September, 1929 (N.Y.).

Bermuda: *Stewardson Brown* 608, hillsides, St. David's Isl., February 10–March 9, 1908 (Chi.; Gray; N.Y.; U.S.); *Brown* 668, Tucker's Town, May 22–June 2, 1909 (Gray; N.Y.; U.S.); *Brown & N. L. Britton* 138, sand-hills, Paget, August 31–September 20, 1905 (Chi.; Gray; N.Y.; U.S.); *Brown & Britton* 823, sand-hills, Castle Point, August 27–September 21, 1912 (N.Y.); *Brown & Britton* 1022,

hillside near Bassett's Caves, August 27–September 21, 1912 (N.Y.); *Brown & Britton* 1043, cay east of Trunk Isl., Harrington Sound, August 27–September 21, 1912 (N.Y.); *Brown & Britton* 1061, hillside, Cooper's Isl., August 27–September 21, 1912 (N.Y.); *Brown & Britton* 1068, south end of St. David's Isl., August 27–September 21, 1912 (N.Y.); *F. S. Collins* 36, hillside near Flatts, May 3, 1912 (Gray); *Collins* 226, native name *dogbush*, Walsingham, August 17, 1913 (Chi.; Gray; N.Y.); *T. J. Harris* 426, April 15, 1906 (Chi.; N.Y.; U.S.); *J. W. Harshberger*, limestone sinks, Walsingham, June 16, 1905 (N.Y.); *C. F. Millspaugh* 67, opposite Hamilton, December 29 and 30, 1898 (Chi.); *Millspaugh* 85, Walsingham, December 31, 1898 (Chi.); *Albert Hanford Moore* 2861, dry soil, roadside, St. David's Isl., July 8, 1905 (Chi.; Gray).

Cuba: *N. L. Britton & Percy Wilson* 5589, coastal thicket, Casilda, Prov. Santa Clara, March 16, 1910 (N.Y.; U.S.); *N. L. Britton, E. G. Britton, & Wilson* 15718, bucida thicket, vicinity of Columbia, Isle of Pines, March 19–21, 1916 (Chi.; N.Y.; U.S.); *J. G. Jack* 8669, cult., 6–8 feet tall, in Harvard Univ. Bot. Garden, from Santa Clara Prov., February 13, 1933 (N.Y.); *O. E. Jennings* 276*B*, Isle of Pines, May, 1910 (N.Y.); *Jennings* 2267, in wet, sandy soil at west base of Mount Colombo, Isle of Pines, May 14, 1910 (Gray; U.S.); *Leon & Edmond* 8567, in thickets, Sabana de Motembo, Prov. Santa Clara, January 4, 1919 (U.S.); *Antonio Luna* 22, Lomas de Banao, Santa Clara, January 9, 1920 (N.Y.); *Luna* 7668, mountains of St. Spiritus, Loma La Gloria, Gavilanes, January, 1918 (N.Y.); *Elizabeth R. Mitchell* 5, shrub 5 feet tall, in red soil with much iron, on dry hilltop, alt. 2,000 feet, Nipe Mountains, Prov. Oriente, March 1, 1928 (Gray; U.S.); *Leon & Roca* 7982, alt. 900 meters, Loma la Gloria, Banas Mountains, Prov. Santa Clara, July 30, 1918 (U.S.); *J. A. Shafer* 2981, slender shrub 3–6 feet tall, forming thickets after fire, pine lands, Sierra Nipe, near Woodfred, Prov. Oriente, December 4, 1909 (Chi.; N.Y., 2 sheets; U.S.); *Shafer* 3590, tree 18 feet tall, trunk diam. 3 inches, open pine woods, alt. 500–650 meters, Sierra Nipe, near Woodfred, December 18, 1909 (Chi.; N.Y.; U.S.); *Shafer* 11985, slender shrub 6–8 feet tall, on blue serpentine, in thicket, Bahia Honda to El Rosario, Prov. Pinar del Rio, January 29, 1912 (Chi.; N.Y.; U.S.); *Shafer* 12433, shrub 6 feet tall, dry hillside, Holquin, Prov. Oriente, April 4, 1912 (N.Y.); *C. Wright* 2172, Palenque, 1860–1864 (Gray); *Wright* (similarly) 2172, in 1865 (N.Y.; U.S.).

Santo Domingo: *W. L. Abbott* 1942, alt. 600 to 850 meters or less, Maniel Viejo, Prov. de Barahona, March 7–10, 1922 (U.S., 2 sheets);

E. L. Ekman H9294, alt. 1,100 meters, Haiti, November 13, 1927 (U.S.); *Miguel Fuertes* 189, alt. 50 meters, at Palomino Rivulet, near Barahona, Prov. Barahona, 1912 (Chi., where approaching f. *linearis;* Gray); *Jaeger* 78, Haiti (N.Y.); *E. C. Leonard* 4274, alt. about 1,300 meters, vicinity of Furcy, Haiti, May 26–June 15, 1920 (approaching f. *spatulata;* Gray; N.Y.; U.S.); *E. C. Leonard & Genevieve M. Leonard* 14995, slender tree 15 feet tall, alt. 630–1,500 meters, Moustique Mountains, vicinity of Bassin Bleu, Haiti, April 21, 1929 (N.Y.; U.S.); *George V. Nash* 1762, shrub or small tree, 8–12 feet tall, alt. 3,000 feet, mountain slope, La Brande to Mount Balance, Haiti, August 15, 1905 (N.Y.); *H. von Tuerckheim* 2970, near Constanza on dry slopes, February, 1910 (Chi.; Gray; N.Y.; U.S.); *E. J. Valeur* 851, tree, open soil, native name *Palo de Reina,* alt. 3,000–4,000 meters, Moncion, Prov. Monte Cristy, April 18, 1933 (N.Y.; approaching f. *spatulata*); *Valeur* 910, tree, native name *Palo de Reina,* Loma Bajita, Dominican Republic, June 9, 1933 (N.Y.).

Jamaica: *R. C. Alexander,* Siguanea Hills, 1850 (N.Y.); *N. L. Britton* 1098, Malvern to Stanmore Hill, Santa Cruz Mountains, September 3, 1907 (Chi.; N.Y.; U.S.); *E. Campbell* 5887, alt. 400 feet, King's House, September 9, 1895 (Chi.; U.S.); *J. Arthur Harris & John V. Lawrence* C1598, leeward slopes, Cinchona, Blue Mountains, 1915 (N.Y.; U.S.); *William Harris,* September 9, 1895 (Chi.); *Wm. Harris* 8578, Cinchona, May 27, 1903 (Chi.; N.Y.); *Wm. Harris* 9658, alt. 2,200 feet, Malvern, 1907 (Chi.; N.Y.; U.S.); *Wm. Harris* 11753, shrub or small tree up to 15 feet tall, alt. 300–900 feet, Lititz Savanna, 1914 (Chi.; Gray; N.Y.; U.S.); *John Hart* 2025, in 1886 (Chi.; U.S.); *Mr. March* 240 (N.Y.); *William R. Maxon* 1197, on shaded banks, alt. 1,500 meters, Cinchona, April 17, 1903 (Chi.; U.S.); *Maxon* 1342, alt. 1,500 meters, vicinity of Cinchona, March 22, 1920 (Chi.); *Maxon* 1506, shrub 10 feet tall, near Green River on trail from Cinchona to Blue Mountain Peak, April 22, 1903 (U.S.); *Maxon & Ellsworth Killip* 581, on open, shady slopes, alt. 1,475 meters, vicinity of St. Helen's Gap, St. Andrew, March 4, 1920 (Chi.; Gray; U.S.); *Maxon & Killip* 1342, alt. 1,500 meters, vicinity of Cinchona, March 22, 1920 (Gray; U.S.); *George Nichols* 170, wood borders, alt. 5,000 feet, Cinchona, July 27, 1903 (Chi.; Gray; N.Y.; U.S.); *C. R. Orcutt* 3055, Arntully, September 26, 1927 (U.S.); *Orcutt* 5118, Arntully (Calif.; U.S.); *J. R. Perkins* 1238, Blue Mountains, Portland, April 5, 1916 (Gray); *Forrest Shreve,* on dry slopes, Cinchona, May, 1903 (N.Y.).

Puerto Rico: *Oersted* 2994, on Mount Candelaria, February, 1847 (Chi.).

Pretoria: *O. B. Miller* (Forest Dept. Herb. no.) 4081, on abandoned forest lands, 5 feet tall, important in promoting regeneration, Distr. Flagstaff C. P., April, 1922 (Arn.).

Arabia: *Botta*, Taifa, 1838 (N.Y.); *G. Schweinfurth* 743, Mahsabe bei Wolledje, January 19, 1889 (Gray).

Iraq: *Yusuf Lazar* 558, near Bagdad, March, 1935 (Chi.; Gray).

Persia: *J. Bornmüller* 655, March 12, 1893 (Arn.).

Afghanistan: *East India Company* 1021/1 (Gray).

British East India: *Bis Ram* 436, native name *santha*, Camp Ana, Salt Range, Punjab, 1928 (Arn.; N.Y.); *R. R. Stewart* 1076, cult. as hedge, Pathankot, Punjab, February 8, 1917 (Arn.); *R. Strachey & J. E. Winterbottom*, alt. 1,500 feet, Simla Hills, Himalaya (Gray); *T. Thomson*, alt. 1–2,000 feet, northwest Himalaya (Gray); *Mrs. Kanoth Yeshoda* 78, alt. 3,000 feet, Hosur Taluk, Distr. Salem, south India, October 9, 1931 (N.Y.); *Mrs. Yeshoda* (similarly) 78, same place, May 24, 1932 (Arn.); *Mrs. Yeshoda* 78*A*, same place, January 15, 1932 (N.Y.).

China (including Hainan): *Luetta Chen* 52*A*, growing 3.5 feet tall, Kushan Monastery near Foochow, Fukien, October 4, 1935 (Arn.); *N. K. Chun & C. L. Tso* 43932, tree 5 meters tall, trunk diam. 10 cm., alt. 2,400 feet, in thickets, Dung Ka, Hainan, September 25, 1932 (N.Y.); *H. H. Chung* 4677 and 5486 (N.Y.); *Chung* 4932, shrub at top of hill, Amoy, Nanputo, Fukien, June 5 (Arn.); *Chung* 7402, Fukien Province (Chi.); *Fortune* 24, in 1845 (Gray); *J. Linsley Gressitt* 1765, shrub 1 meter tall, on partly wooded hill, alt. 250 meters, Kakchieh, Swatow, East Kwantung, August 8, 1936 (Arn.); *S. K. Lau* 2832, fairly common on dry, gentle, sandy slope, in thicket, 3 meters tall, trunk 3 cm. diam., Ka Chik Shan and vicinity, Ch'angkiang Distr., Hainan, December 15, 1933 (Arn.); *T. N. Liou* 1596, Amoy, Kulangyü, Fukien, September 1, 1930 (N.Y.); *F. A. McClure*, herb. no. 7933, Hainan, 1921–1922 (Arn.); *T. Thomson* 1450, grassy hills, Isl. Kulungsu, over against Town of Amoy, August, 1865 (Gray); *Tsang Wai Tak* 202, behind Hui Ka, Lin Fa Shan and vicinity, Lam Ko Distr., Hainan, July 30, 1927 (Arn.; Calif.; N.Y.).

Formosa: *Abbé Urbain Faurie* 271, Hokuto (Arn.); *K. Odashima* 17825, Sirin, Taihoku-syu, July 10, 1935 (Arn.; Chi.; N.Y.); *Odashima* 17880, same place, May 29, 1934 (Arn.; Chi.; N.Y., 2 sheets); *Richard Oldham* 83, Tamsuy, 1864 (Chi.; Gray; N.Y., 2 sheets).

Philippine Islands: *M. Ramos* 4912, Pangasinan Province, Isl. Luzon, December, 1907 (N.Y.); *J. K. Santos* 31739, Benguet Subprovince, Isl. Luzon, April–June, 1918 (Arn.).

Netherlands East Indies: *Forest Serv.* 16991, May 26, 1932 (Arn.).

New Caledonia: *I. Franc* 637, in thickets near the shore, Nouméa, July, 1909 (Arn.; Chi.; Gray, 2 sheets; N.Y.; U.S.); *Franc* (similarly) 637, December, 1906 (N.Y.); *Franc* 2382, shrub 2 meters tall, Nouméa, 1929 (Arn.); *Franc* 2460, shrub in thickets on slopes, Nouméa (Ouen Toro), 1930 (Arn.; Calif.; Chi.; N.Y.; U.S.).

Fiji Islands: *Otto Degener* 15347, shrub 2.5–3 feet tall, dry grassland, alt. 50–200 meters, Mataimeravula, vicinity of Rewasa, Ra, Viti Levu, May 28, 1941 (Arn.); *J. Horne* 386, *annis* 1877–1878 (Gray); *B. Seemann* 72, in 1860 (Gray); *Albert C. Smith* 826 *p. p.*, tree 4 meters tall, on exposed cliff-head, native name *wosi*, alt. 150–350 meters, hills west of Mbutha Bay, Natewa Peninsula, Thakaundrove, Vanua Levu, December 21, 1933 (Calif.; N.Y.); *Smith* 1425, shrub 2 meters tall, in open places, alt. 100–200 meters, central volcanic section, near Lomaloma, Vanua Mbalavu, March 28, 1934 (N.Y.); *United States Explor. Exped. under Capt. Wilkes*, 1838–1842 (Gray).

Australia: *J. L. Boorman*, Gunnedah, New South Wales, August, 1907 (Chi.); *Miss O. M. Court*, on sand-hills, Yeppoon, Queensland, July, 1925 (Arn.); *Sabine Helms* 1120, shrub, Magnetic Isl., north Queensland, 1922 (Arn.); *E. J. Smith*, Mount Edwards, September, 1933 (Arn.).

New Zealand: *Banks & Solander* (*Capt. Cook's 1st Voyage*), 1768–1771 (U.S.); *T. F. Cheeseman*, Woodhill, North Isl., October, 1882 (U.S.); *Mr. Dupetit-Thonar*, Baie des Iles (Gray); *T. Kirk*, North Isl. (Gray); *Kirk* 86, Kaipaia, North Isl. (U.S.); *Kirk* (similarly) 86, Omaha, North Isl. (Gray); *D. Petrie* 138, Hawkes Bay, North Isl. (Gray); *Védel*, in 1847 (U.S.).

Dodonaea viscosa var. *β* **linearis** f. 3. **arizonica** (A. Nels.) Sherff, Amer. Journ. Bot. 32: 214. 1945. *Dodonaea arizonica* A. Nels. *ibid.* 21: 576. 1934.

This forma differs from the two previous formae in having definitely pubescent branchlets to the inflorescence. In the first two formae, the branchlets are glabrous to obscurely or sparsely setulose.

Occasionally a very few of the hairs on the branches of the inflorescence are somewhat closer together in pairs, suggesting an approach to *D. eriocarpa* of the Hawaiian Islands, the Galapagos Islands, and the Island of Java, which in many of its varieties has a more or less stellate pubescence.

Specimens examined for f. 3. *arizonica:*

Western Texas: *A. Schott*, Bravo del Norte (Chi.).

Arizona: *Alice Eastwood* 15952, near Fish Creek, on Apache Trail, October 22, 1928 (Chi.); *Sister Mary Noel Fochtman* 217, lower slopes of Baboquivari Mountains, December 2, 1936 (Chi.; N.Y.); *F. Raymond Fosberg* 7498, shrubs 2 meters tall, rocky slopes, foothills of Baboquivari Mountains, Pima County, April 2, 1932 (Chi.); *J. W. Gillespie* 5388, alt. 3,300 feet, canyon near Superior, Pinal County, March 19, 1932 (Calif.; N.Y.); *Gillespie* 8539, alt. 2,800 feet, Apache Gap, on Apache Trail, Pinal County, October 11, 1931 (Calif.; Gray); *M. F. Gilman* 141, Fresnal, Pima County, April 13, 1928 (N.Y.); *Herbert W. Graham*, picnic grounds, Sabino Canyon, alt. 3,000 feet, Santa Catalina Mountains, June 25, 1927 (Calif.; N.Y.); *David Griffiths* 2132, on trip to Castle Rock, November 17, 1900 (N.Y.); *Griffiths* 2530, Sabino Canyon, March 23, 1901 (N.Y.); *J. Arthur Harris C*14143, Pima Canyon, Santa Catalina Mountains, April 3, 1914 (N.Y.); *Harris C*16572, at mouth of Sabino Canyon, Santa Catalina Mountains, August 19, 1916 (N.Y.); *M. E. Jones*, Mescal Mountains, May 24, 1890 (Calif.; Gray); *Jones*, alt. 3,000 feet, Sabino Canyon, Catalina Mountains, August 20, 1903 (N.Y.); *Jones*, Baboquivari Mountains, September 19, 1929 (Gray; N.Y.); *J. G. Lemmon*, Fort Lowell, 1880 (Gray); *Lemmon*, San Antonio Creek near Fort Lowell, 1880 (Chi.); *F. E. Lloyd*, Pima Canyon, vicinity of Tucson, November 11, 1906 (Chi.); *Lloyd*, Vent Canyon, vicinity of Tucson, April 24, year not certain (Chi.; Gray); *Aven Nelson* 10307, hillsides along Apache Trail, Phoenix-Globe Highway, May 3, 1925 (N.Y.); *Nelson* 11276, hillsides between Canyon Lake and Roosevelt Dam, Salt River, March 20, 1930 (type collection, N.Y.); *Aven Nelson & Ruth A. Nelson* 1151, foothills of the Baboquivari Mountains, March 13, 1935 (Calif.; Gray; N.Y.); *W. F. Parrish*, Lowell, May 9, 1884 (Chi.); *R. H. Peebles* 11653, "wings of fruit usually 3, occasionally 4," alt. 1,950 feet, Ash Creek, Apache Trail, Maricopa County, May 19, 1935 (Chi.); *C. G. Pringle*, by streams of the Santa Catalina Mountains, flowers June 27, fruit April 18, 1881 (Chi.; Gray); *C. L. Shear* 4246, Santa Catalina Mountains, April 10, 1906 (N.Y.); *Forrest Shreve* 5139, tree 12 feet tall, alt. 3,200 feet, Pima Canyon, Santa Catalina Mountains, April 4, 1917 (Calif.; Gray); *W. T. Swingle*, Allison Dam, Baboquivari Mountains, Pima County, July 10, 1931 (N.Y.); *J. W. Toumey*, Tucson, January–May, 1894 (Calif.; Gray; N.Y.); *Toumey*, Tucson, 1895 (N.Y.); *M. C. Wiegand & G. B. Upton* 4614, Sabino Canyon, Tucson, April 22, 1922 (Chi.).

Sonora, Mexico: *H. S. Gentry* 1389, on oak ridge and pine mesa, 6–7 feet tall, in lower canyon becoming a tree, Sierra Chiribo, Río Mayo, March 7, 1935 (Calif.; Chi.); *Edward Palmer* 290, waterfall, mountains, Guaymas, October, 1887 (Calif.; Gray; N.Y.); *George Thurber*, Rayon to Ures, 1852 (Gray); *Thurber* 909, mountain pass between Magdalena and Cucurpe, October, 1851 (Gray; N.Y.); *Stephen S. White* 2800, slender shrub 1 meter tall, Tarachique, Cañon de la Escalera, June 23, 1940 (Calif.); *Ira L. Wiggins* 5913, granitic hills 2 miles south of Sasabe, October 21, 1932 (Calif.); *Wiggins* 7156, gravelly, red soil, 20 miles southeast of Magdalena, September 12, 1934 (Calif.).

Dodonaea viscosa var. γ **arborescens** (Cunn.) Sherff, Amer. Journ. Bot. 32: 214. 1945 and f. **arborescens** Sherff *loc. cit.* *Dodonaea arborescens* Cunningham *ex* W. J. Hook. Journ. Bot. 1: 251. 1834 (as a syn. for *D. Aspleniifolia* var. β W. J. Hook. *loc. cit.*). *Dodonaea Aspleniifolia* var. *arborescens* (Cunn.) J. D. Hook. *ex* W. J. Hook. *op. cit.* 2: 415. 1840.

Bentham (Fl. Austral. 1: 476. 1863), as already stated, treated *Dodonaea viscosa* as having three varieties, namely *vulgaris*, *angustifolia* (our *linearis*), and *spatulata*.[1] The third variety, which we may now notice in detail, had been described years before by Smith (*in* Rees *et al.* Cyclop. 12: *sub Dodonaea.* 1809) as the species *Dodonaea spatulata.* Bentham wrote: "Usually a more bushy and not so tall a shrub as the preceding varieties, often very viscid. Leaves shorter . . . obovate-oblong, oblong-cuneate, spathulate, oblanceolate or broadly linear-cuneate, usually obtuse or sometimes truncate, the lateral veins usually conspicuous. . . . Capsules very variable, but generally intermediate between those of the var. *vulgaris* and *angustifolia*, but nearer to the former. . . . This is the commonest, perhaps the only form in Victoria, Tasmania, and S. Australia . . . and some of the Sandwich Island specimens can be precisely matched in Australia. . . . *D. asplenifolia*, Rudge, in Trans. Linn. Soc. xi. 297, t. 20 . . . is an apparently rare form with linear-cuneate, 3-toothed leaves. . . ."

There seems no question that Bentham's judgment as to *D. Aspleniifolia* Rudge (based on a plant from near Port Jackson, at Sydney, New South Wales) was sound. However, Bentham appears to have

[1] As already noted, Smith's original spelling *spatulata* was altered by Bentham to *spathulata.* Since each spelling has good standing in the Latin, I have retained Smith's on grounds of priority.

overlooked Allan Cunningham's name *arborescens*, which had been assigned to varietal status in 1840, and, according to present rules, must be taken up in place of *spatulata*. The type of var. *arborescens* was *Ronald Gunn* 377, Tasmania. It had been given the manuscript name *Dodonaea arborescens* by Cunningham but was reduced by W. J. Hooker to a variety of the Australian *D. Aspleniifolia* and described as follows: "Var. β foliorum apicibus magis dentato-sinuatis, ramis angustioribus." I have seen several specimens from eastern Australia and from Tasmania that answer to this leaf-description. Many or most of their leaves are more or less sinuate-dentate *at the apex and somewhat down the margins*. A specimen even from Florida (*Small & Wilson* 2035) and apparently one from Ecuador (*Hitchcock* 21411) are identical. None of the specimens examined appear in any way teratological or monstrous. They may, therefore, be taken as representing a true taxonomic entity, in this case a variety. This variety in its strictest sense, exemplified by its type, *Gunn* 377 from Tasmania, may be designated further as f. 1. *arborescens, foliorum apicibus marginibusque plus minusve sinuato-dentatis*.[1]

Specimens examined, f. 1. *arborescens* only:

Florida: *J. K. Small & P. Wilson* 2035, in woods near the beach, St. Augustine, May 22, 1904 (N.Y.; remarkable as being American, but in aspect close to Tasmanian plants of this form).

Ecuador: *Albert S. Hitchcock* 21411, shrub, on dry hill, alt. 1,800–2,600 meters, between La Toma and Loja, Prov. Loja, September 4, 1923 (Gray; N.Y.; scarcely typical but, particularly at Gray, closer to this forma than to f. *spatulata*).

France: *Ch. Naudin*, Villa Thuret (where evidently cultivated), March 24, 1887 (Arn.).

Australia: *Caly*, Parramatta, New South Wales, 1803 (Arn.); *S. L. Everist* 741, small tree with slender branches, Noondoo, Maranoa District, Queensland, December 14, 1934 (Arn.); *Everist* 1825, slender shrub up to 8 feet tall in gray clay soil, Lisgool, Mitchell District, Queensland, June 20, 1939 (Arn.); *W. D. Francis*, Wallumbilla, Western Railway Line, Queensland, September 15 and 16, 1925 (Arn.); *C. E. Hubbard* 5101, in sandy soil, open eucalyptus forest, alt. *circ.* 900 feet, near Wandoan, Queensland, November 17 and

[1] Through its f. *arborescens*, *D. viscosa* approaches the usually narrower-leaved *D. attenuata* Cunn. of Australia. In the latter species, one or two lateral lobes or leaflets often occur irregularly along the leaf-blade, suggestive of the pinnately compound-leaved species of *Dodonaea*.

18, 1930 (Arn.); *Hubbard* 5697, among granite boulders and in crevices of rocks in open forest, alt. 3,300 feet, Stanthorpe, Great Dividing Range, Queensland, 1931 (Arn.); *C. T. White*, Crow's Nest, North Darling Downs, Queensland (Arn.); *White*, Inglewood, southeastern Queensland, November, 1922 (Arn.); *White* 9503, shrub 2 meters tall, Roma, Queensland, October 25, 1933 (Arn.); *H. B. Williamson*, Mount Fero, Victoria, October, 1927 (Chi.).

Tasmania: *William Archer* (U.S.; topotype and clearly a typical specimen); *J. H. Maiden*, Risdon Cove ("Robert Brown collected here in 1803"), February, 1906 (Calif.); *C. T. White* 8326, upright shrub or small tree, 2–3 meters tall, common on dry, stony hillsides, Bellarive, near Hobart, 1932 (Arn.).[1]

Bentham's description of his third variety, *spatulata*, evidently covers a considerable number of slightly varying races or strains with leaves more or less spatulate, but not or only negligibly dentate or sinuate. Most of these are best represented by the type (Kew) of *Dodonaea spatulata* Smith from the Hawaiian Islands and may be called more precisely *D. viscosa* var. *arborescens* f. 2. *spatulata* (Smith) Sherff (Amer. Journ. Bot. 32: 214. 1945).[2] (For certain broader-leaved material, see f. *Ehrenbergii* below.)

Specimens examined for f. 2. *spatulata:*

Florida: *Mr. Blodgett*, low shrub, Charlotte Harbor (N.Y.); *A. H. Curtiss* 485 *p. p.*, on sand ridges between the ocean and Indian River, September (Chi.; N.Y.); *A. P. Garber*, St. Augustine, July, 1876 (N.Y.); *F. W. Hunnewell* 8755, in sandy woods near beach, St. John County, March 1, 1923 (Gray); *J. K. Small* 2314, in woods near beach, St. Augustine, December 2, 1904 (N.Y.); *Small & J. B. De Winkeler* 9037, on sandhills, Avon Park to Sebring, May 1, 1919 (N.Y.); *S. M. Tracy* 7481 *p. p.*, Sanibel Isl., May 15, 1901 (Calif.; Chi.).

Mexico: *C. Conzatti* 1498, alt. 2,200 meters, Alturas de Matatlán, State of Oaxaca, June 19–23, 1906 (N.Y.); *Edward Palmer* 495, alt. about 320 meters, vicinity of Victoria, State of Tamaulipas, May 1–June 13, 1907 (Calif.; Gray); *C. A. Purpus* 121, alt. 6,000–7,000 feet, San Pablo, Baja California, January–March, 1898 (N.Y.);

[1] The Francis and Hubbard and White specimens belong with f. *arborescens* but display an approach toward f. *spatulata*.

[2] *Dodonaea viscosa* f. *arborea* Hert. Rev. S. Amer. Bot. 3: 168. 1936. *Nomen. D. arborea* Hert. *op. cit.* 5: 35. 1937.—Herter's type basis was his no. 96921, from Cerro Animas, Dept. Maldonado, Uruguay, an excellent isotype of which I have before me (Chi.). It can be matched by various specimens of f. *spatulata* from Australia, Hawaiian Islands, and elsewhere.

F. Lyle Wynd & C. H. Mueller 89, along dry creek bed, between Hipolito and Sacramento, State of Coahuila, June 15, 1936 (N.Y.).

Colombia: *F. W. Pennell* 2352, shrub, on grassy hill 4 miles southwest of Bogota, alt. 2,700–2,800 meters, October 4–8, 1917 (Chi.; Gray; N.Y.).

Peru: *C. Vargas* 9781, shrub, 1–3 meters tall, alt. 2,300–2,800 meters, on clayey or rocky slopes, common in xerophytic canyons of the Apurimac system, Hacienda Jucre, Prov. Grau, Dept. Apurimac, native name *chaman* or *chamana*, January 18, 1939 (Calif.; Chi.); *Llewelyn Williams* 7564, shrub, alt. 2,700 meters, on sierras, Chachapoyas, Dept. Amazonas, January, 1930 (Chi.).

Bolivia: *José Steinbach* 6017, shrub, 103 meters tall, native name *chaka-tia*, alt. 2,000–3,600 meters, Dept. Cochabamba (Chi.).

Uruguay: *W. G. Herter* (*herb. no.*) 96921, growing 5 meters tall, alt. 50 meters, in dryish, open, stony places, Cerro Animas, Dept. Maldonado, April 10, 1936 (Chi.; *sub nom. D. viscosa f. arborea* Hert.); (*ex herb.*) *C. Diego Legrand* 792, Cerro Animas, Maldonado, native name *chilca de sierra*, June 16, 1936 (Chi.).

Island of Socotra: *Commun. Bayley Balfour* 659, February–March, 1880 (Gray).

Kenya Colony: *Edgar A. Mearns* 387 *p. p.*, alt. *circ.* 2,000 meters, between Oljoro-o-Nyon and Narok rivers, June 7 and 8, 1909 (Chi.; Gray).

British East India: *Eileen W. Erlanson* 5178, undershrub, dry hillside, Trivandrum, Travancore, January 8, 1934 (N.Y.); *Schlagintweit*, alt. 1,400–2,500 feet, Musakél, Prov. Punjab, February 17–March 5, 1857 (Gray); *R. R. Stewart* 16570*B*, alt. 2,000 feet, Nurpur, Rawalpindi District, Punjab, February–April, 1938 (Arn.).

Indo-China: *J. & M. S. Clemens* 3210 *p. p.*, common dune shrub, Tourane (Turan) and vicinity, Annam (Anam), May 23–26, 1927 (Calif.; N.Y.); *C. B. Robinson* 1056, Nha-trang and vicinity, Annam, March 11–26, 1911 (N.Y.).

Philippine Islands: *R. C. McGregor* 43622, Burgos, Prov. Ilocos Norte, Isl. Luzon, November, 1923 (Arn.; Calif.); *Ramos* 27157, Burgos, February and March, 1917 (Arn.).

Fiji Islands: *Albert C. Smith* 86, slender tree 4 meters tall, native name *usi*, among reeds, alt. 200–400 meters, on hills, above Namalata and Ngaloa bays, Kandavu, October 13–18, 1933 (Calif.; N.Y.; U.S.).

New Caledonia: *Vieillard* 246, Wagap, Gatopa, 1861–1867 (N.Y.).

Cook Islands: *Harold E. Parks & Susan Thew Parks* 22332, Isl. Rarotonga, May–July, 1929 (Calif.; Chi.; Gray; N.Y.); *Gerrit Wilder*, same island, 1929 (N.Y.).

Hawaiian Islands *in general* or from Oahu (for Lanai, etc. see below): *Mr. W. Hancock* (Kew no.) 51, in 1898 (Kew); *A. Menzies*, topmost shrubs on the Sandwich Islands, alt. 6,000 feet (Kew, type material); *W. A. Bryan*, Diamond Head, Oahu, December 6, 1903 (Bish.); *Degener, Topping, Martinez, & Salucop* 11195, below forest, on ridge directly north of Kaala summit, Oahu, March 26, 1937 (Arn.; Berl.; Calif.; Chi.; Corn.; Del.; Gray; Par.); *F. R. Fosberg* 13184, shrub 1.5 meters tall, alt. 20 meters, on dry, rocky bluff, Keaau, July 24, 1936 (Chi., etc.); *Fosberg* 13185, shrub 2 meters tall, same place and date (Chi., etc.); *F. R. Fosberg & Katherine Duker* 9049, small tree 2.5 meters tall, alt. 480 meters, in dry forest, head of Makua Valley, Makua, November 25, 1932 (Chi.); *Mann & Brigham* 582 (Bish.); *J. M. Oliveira & V. O. Fosberg* 97, on dry, bushy slope, east slope of head of Kalama Valley, Maunalua, Oahu, March 7, 1937 (Chi., etc.); *O. Selling*, cult., Kamehameha School garden, Honolulu, Oahu, June 30, 1938 (Goth.).

Hawaiian Islands: Lanai: *George C. Munro* 68, native name *aalii*, Kaluanui, flowering April 16, 1914 and seeding September 26, 1913 (Bish.); *Munro* 121, Kaluanui, bend beyond Waipaa (*i.e.*, Waiapaa), September 26, 1913 (Bish.); *Emilio Ordoñez* (*Degener distrib. no.*) 12846, Puu Alii, July 14, 1940 (Arn.; Berl.; Calif.; Chi.; Corn.; Gray; Minn.; Mo.; Phila.).

Hawaiian Islands: Maui: *Cranwell, Selling, & Skottsberg* 2802, in brushwood on crater floor, Haleakala, August 4, 1938 (Goth.); *C. N. Forbes* 2009-*M*, on south slope of Haleakala, March 18, 1920 (Bish.; Chi., etc.).

Hawaiian Islands: Hawaii: *Cranwell, Selling, & Skottsberg* 3259, vicinity of Kilauea, September 12, 1938 (Goth.); *Otto Degener* 11150, in arid regions, in volcanic ash near crater, Kilauea, December 10, 1922 (Arn.; Chi.; N.Y.); *Degener* 11151, in hot, sunny situation near ocean, near Hawaiian rock-figures, Kamoamoa, August 23, 1922 (Arn.; Berl.; Chi.); *Degener* 11152, in lava desert, Kilauea, December 18, 1922 (Chi.); *Degener* 11158, in rocky pasture, Punaluu, July 25, 1926 (Chi.); *Degener* 11170, in dry region, Kipuka Puaulu, Kilauea, July 8, 1929 (Arn.; Berl.; Chi.; Del.; N.Y.); *Degener* 11172, near Volcano House, Kilauea, July 20, 1929 (Chi.); *Alice Eastwood*, bird forest near volcano, August 1–16, 1924 (N.Y.); *Abbé Urbain Faurie* 278, alt. 2,000 meters, Mauna Kea, July, 1909

(Arn.; Del.; Par.); *C. N. Forbes,* Kilauea (Bish.); *Forbes* 305-*H,* on slopes of Mauna Loa, near Puu o Uo, Kona, July 9, 1911 (Bish.; Calif.; Mo.); *Forbes* 308-*H,* on slopes of Mauna Loa, below Puu o Uo, July 14, 1911 (Bish.); *Forbes* 966-*H,* June 27, 1915 (Bish., etc.); *Forbes* 976-*H, kipukas* in Lava Flow of 1823, at level of Keawewai, June 28, 1915 (Bish.); *Forbes* 1032-*H,* above Puu a Ulu, July 1, 1915 (Bish.); *Forbes with Brigham & C. L. Thompson,* Volcano Kilauea, September, 1908 (Bish.; Calif.; Mo.; N.Y.); *F. R. Fosberg* 10146, bush 1 meter tall, alt. 950 meters, on *pahoehoe* lava, Mauna Iki, Kau Desert, August 31, 1933 (Chi., etc.); *Fosberg* 10148, bush 1.5 meters tall, alt. 900 meters, on old lava, Volcano Road above Mauna Iki, August 31, 1933 (Chi., etc.); *V. O. Fosberg* 51, bush 2–3 meters tall, dry lava flow, between 1887 and 1868 flows, August 10, 1936 (Chi.); *Galathea Expedition* 3390, years 1845–1847 (Bish.); *Constance Hartt & M. Neal* 877, alt. 6,500 feet, Humuula, August 19, 1935 (Bish.); *Hartt & Neal* 878, alt. 6,500 feet, same place and date (Bish.); *William Hillebrand,* Isl. Hawaii (Kew); *Hillebrand,* alt. 4,000 feet, July, 1865 (Chi.); *A. S. Hitchcock* 14638, alt. 5,000 feet, Mauna Loa, September 13, 1916 (U.S.); *Mrs. G. Earle Kelly* 261, Kilauea, July, 1916 (Arn.); *Mann & Brigham,* Kilauea (Bish.); *Mann & Brigham* 308, central plateau of Hawaii (Gray; Mo.); *Mann & Brigham* 410, Kilauea (Chi.; N.Y.); *Marie C. Neal,* Kilauea Summer Camp, Kilauea, July 28, 1927 (Bish.); *Neal,* same place, August 16, 1929 (Bish.; Chi.); *Neal, Hartt, & John Martin,* alt. 8,250 feet, summit of Mount Hualalai, June 19, 1934 (Bish.; N.Y.); *Jules Remy* 568, years 1851–1855 (Par.); *Joseph F. Rock* 3764, summit of Mount Hualalai, June 9, 1909 (Gray); *Rock* 3766, same place and date (Gray); *Rock* 3767, same place and date (Gray); *Rock* 3852, alt. 8,200 feet, same place and date (Bish.; Gray; Par.; U.S.); *W. A. & C. B. Setchell,* June 23, 1924 (Calif.); *Carl Skottsberg* 491, alt. 1,200 meters, crater of Kilauea, December 9, 1922 (Bish.; Goth.); *Skottsberg* 497, same place, September 12, 1922 (Goth.); *Skottsberg* 522, below Rest-house, slope of Mauna Loa, September 15, 1922 (Bish.; Goth.); *Skottsberg* 1121, between Kilauea and Kapapala, September 18, 1922 (Bish.; Goth.); *United States Explor. Exped.,* Isl. Hawaii (Gray; U.S.); *U. S. Explor. Exped.,* at 8,000 feet station, Mauna Loa, 1838–1842 (N.Y., 2 sheets); *R. L. Usinger* 2, *aa* lava flat, Humuula, August 3, 1935 (Bish.).

Australia: *E. H. Wilson* 488, cult., Zoological Gardens, Perth, Western Australia, November, 1920 (Arn.); *C. T. White* 5502, shrub 8 feet tall, abundant on hillsides, Morialta near Adelaide,

South Australia, November 19, 1927 (Arn.); *J. L. Boorman*, Hargreaves, New South Wales, January, 1913 (Chi.).

Tasmania: *Caly*, December, 1805 (Arn.).

New Zealand: *T. Kirk*, South Isl. (Chi.).

Dodonaea viscosa var. γ **arborescens** f. 3. **Ehrenbergii** (Schlecht.) Sherff, Amer. Journ. Bot. 32: 214. 1945. *Dodonaea Ehrenbergii* Schlecht. Linnaea 17: 639 (sphalm 739). 1843; *ibid.* 18: 36 (sphalm 52). 1844. *Dodonaea viscosa* var. *obovata* Hitchc. Report. Missouri Bot. Gard. 4: 73. 1893. *Dodonaea microcarya* Small, Torreya 25: 38. 1925.

Because of the extreme polymorphism present in *D. viscosa*, some of its almost innumerable forms frequently look mutually more unlike than many entities that commonly pass as distinct species. Mainly for this reason most of them have been segregated under special names. The name *Dodonaea Ehrenbergii* was applied by Schlechtendal to a tree or shrub, specimens of which had been collected by C. Ehrenberg on the plains of Santo Domingo. A good specimen of Ehrenberg's original material is in the Herbarium of the New York Botanical Garden. It is matched in varying degrees by an extensive assortment of plants from the West Indies and by some from Florida.

Radlkofer, at various times during his long-continued studies on *Dodonaea*, examined various collections from the West Indies. In his extensive treatment of *D. viscosa* (*in* Martius, Fl. Brasil. 13^{III}: 644. 1900), he reduced *D. Ehrenbergii* to *D. viscosa* var. *spatulata* (which, as shown above, is reducible to a forma of var. *arborescens*). Numerous herbarium specimens more or less typical for *D. Ehrenbergii* were labeled by him *D. viscosa* var. *spatulata*. Thus, for example, as late as June, 1913, he determined a specimen, one quite typical for *D. Ehrenbergii*, as *D. viscosa* var. *spatulata*. This had been collected by *Britton, Britton, & Cowell*, no. 12475, on coastal cliff, Punta Piedra, Nipe Bay, Prov. of Oriente, Cuba, March 7, 1912 (in Herb. N.Y.).

In 1893, Hitchcock (*loc. cit.*) had described somewhat broad-leaved specimens from Cat Island and Inagua (both in the Bahama Islands), giving them the new name *D. viscosa* var. *obovata*. It may well be doubted, however, that Hitchcock would have erected a new variety for his plants could he have had access to Radlkofer's exhaustive and critical survey, as then unpublished, of *Dodonaea viscosa* and various of its forms. In recent years, a wealth of speci-

mens from the general region of the West Indies has been brought into herbaria, doubtless totaling many more than Radlkofer could have had for examination. Generally speaking, these may be said to vary from the usual material of f. *spatulata* to somewhat the same extent as the formae *Burmanniana* and *Schiedeana* do from the typical forma (*i.e.*, f. *repanda*) of var. *vulgaris*. Some of the specimens have extremely small fruits (±5 mm. wide over-all when flattened out). Among these are the ones described by Small (*loc. cit.*) as *Dodonaea microcarya*. A great variation occurs, however, in size of fruits, many specimens having medium-sized to larger ones (7–15 or more mm. wide over-all, when flattened out). The leaves are usually shorter and proportionately wider than in var. *arborescens* proper (*i.e.*, its f. *arborescens*) and its f. *spatulata*, more inclined to be broadly rounded or truncate to emarginate at apex, and usually more of a grayish-green (judging from dry material).

It must be noted in all fairness to Radlkofer, that while he had made a substantially cosmopolitan survey of *Dodonaea viscosa* in literature and plant materials, he was concerned, in the work above cited, almost exclusively with the Brazilian flora. Had he included the West Indies and Florida as within the scope of his treatment, he undoubtedly would have enlarged upon his mere notation of *D. viscosa* var. *spatulata*, already cited above (see p. 271) and equivalent essentially to var. *arborescens* of this paper, and listed for it several formae. At all events, the *Dodonaea Ehrenbergii* of Schlechtendal, to extend Radlkofer's treatment today at all consistently, would seem best to rank as a forma under var. *arborescens*.[1]

Specimens examined for f. 3. *Ehrenbergii:*

Florida: *Blodgett*, southern Florida (N.Y.); *John K. Small* 4085, pine lands between Miami and Cocoanut Grove, November 3–

[1] It cannot be emphasized too strongly that in certain localities the f. *Ehrenbergii* may easily appear widely and specifically different from f. *arborescens*. Future authors of floristic works restricted to such localities will perhaps, therefore, be tempted so to treat it. Then, too, there will doubtless always be some botanists who strive for uniformity in assignment of classificatory status to plant entities regardless of the stability or constancy of these entities, or, more particularly, regardless of their tendency in many parts of their geographic range to form countless intergradations. To these I would merely repeat Asa Gray's observation, "Vain is the attempt to draw absolute limits where Nature luxuriates in gradations." (Proc. Amer. Acad. 5: 126. 1861.)

Finally, we should keep in mind the fact that some few botanists, such as the late N. L. Britton and the late C. F. Millspaugh in the latter part of their lives, abandoned varieties as such, reducing them outright to synonymy with their respective species proper, or reducing them to anonymous "races," or setting them off as individual species. Obviously, in following the nomenclatural pathway marked out for the study of *Dodonaea viscosa* by Radlkofer, I have made no attempt to conform to the irreconcilable views of such workers.

December 7, 1912 (N.Y.); *Small* 9883, hammock, northern end of Big Pine Key, May 9, 1921 (N.Y., *sub nom. Dodonaea microcarya* Sm.); *Small, Alfred Cuthbert, & Paul Matthaus* 9105, hammock, northern part of Big Pine Key, May 8, 1919 (N.Y., 2 sheets, type coll. of *D. microcarya* Small).

Bahama Islands: *L. J. K. Brace* 1847, Cherokee Sound, Abaco, December 25, 1904 (Chi.; N.Y.; U.S.); *Brace* 3942, Port Nelson, Rum Cay, December 4, 1905 (Chi.; N.Y.; U.S.); *Brace* 4159, Cove Road to South Side, Long Cay, December 7–17, 1905 (Chi.; Gray; N.Y.; U.S.); *Brace* 4255, Spring Point, Acklin's Isl., December 21, 1905 to January 6, 1906 (Chi.; N.Y.); *Brace* 4679, Landrail Point, Crooked Isl., January 9–23, 1906 (Chi.; N.Y.; U.S.); *Brace* 5327, Rose Cay, Northern Bight, Andros, August 18 to September 10, 1906 (Chi.; N.Y.); *N. L. Britton & C. F. Millspaugh* 5422, edge of coppice, Glass Window to Gregory Town, Eleuthera, February 18, 1907 (Chi.; N.Y.); *Britton & Millspaugh* 5685, coastal whitelands, Little San Salvador, February 25 and 26, 1907 (Chi.; N.Y.); *Britton & Millspaugh* 5989, scrub in white land, edge of a salina, Conception Isl., March 9 and 10, 1907 (Chi.; N.Y.); *W. C. Coker* 444, Port Nelson, Rum Cay, July 10, 1903 (N.Y.); *Coker* 567, shrub, Abaco, July 20, 1903 (N.Y.); *Albert S. Hitchcock*, Crooked Isl., November, 1890 (Chi., plus a fragment *ex typo in herb.* Mo.); *Hitchcock*, Isl. Inagua, December 3, 1890 (Chi., fragm. *ex herb.* Mo.); *C. F. Millspaugh & C. M. Millspaugh* 9043, in a sisal field, Waterloo and vicinity, Grand Turk Isl., February 20–March 24, 1911 (Chi.; N.Y.); *Millspaugh & Millspaugh* 9311, on rocky plain, Ambergris Cay, the Caicos Group, March 12, 1911 (Chi.; N.Y.); *George V. Nash & Norman Taylor* 955, Salt Pond Hill, Inagua, October 12, 1904 (Chi.; N.Y.); *Nash & Taylor* 1032, Tenados, Inagua, October 14, 1904 (Chi.; N.Y.); *Nash & Taylor* 1035, same place and date (Chi.; N.Y.); *Nash & Taylor* 1107, Blakeville, Inagua, October 18, 1904 (Chi.; N.Y.); *Nash & Taylor* 1421, shrub 4–5 feet tall, white-land, near Lantern Head Creek, Inagua, November 3, 1904 (N.Y.); *Nash & Taylor* 3808, shrub, Grand Turk Isl., August 27–September 1, 1905 (N.Y.); *J. T. Rothrock* 279, Crooked Isl., November 24, 1890 (Chi.; N.Y.); *Rothrock* 282, growing 8 feet tall, Crooked Isl., winter of 1890–1891 (Chi.); *Percy Wilson* 7405, Atwood Cay, December 3 and 4, 1907 (Chi.; N.Y.); *Wilson* 7500, Abraham Bay and vicinity, Mariguana, December 6–8, 1907 (Chi.; N.Y.); *Wilson* 7602, South Caicos, Caicos Islands, December 14–16, 1907 (Chi.; N.Y.); *Wilson* 7700, tree 18 feet tall, Kew and vicinity, North Caicos, December 18,

1907 (Chi.; N.Y.); *Wilson* 7875, Hog Cay, Great Ragged Isl., December 26, 1907 (Chi.; N.Y.).

Cuba: *Britton, Britton, & Cowell* 12475, shrub 2 meters tall, on coastal cliff, Punta Piedra, Nipe Bay, Prov. Oriente, March 7, 1912 (N.Y.; U.S.); *J. A. Shafer* 2745, shrub or tree, Cayo Paredon Grande, Camaguey, October 25, 1909 (Chi.; Gray; N.Y.; U.S., 2 sheets); *Shafer* 2775, eastern part of Cayo Cruz, Camaguey, October 27, 1909 (Chi.; Gray; N.Y.; U.S.).

Haiti, etc.: *Harold E. Box* 1265, sandy or rocky seashores and dry, exposed, limestone hills, Corbizon Point, Antigua, Brit. W. Indies, November 13, 1937 (U.S.); *N. L. Britton & W. C. Fishlock* 968, sandy plain, west end, Anagada, Brit. Virg. Isls., February 19 and 20, 1913 (Chi.; N.Y.; U.S.); *Père Duss* 2904, growing 2–4 meters tall, Guadeloupe Isl., 1893 (N.Y.); *C. Ehrenberg,* Isl. Santo Domingo (N.Y.; author's original material); *E. L. Ekman H.*4942, alt. about 600 meters, Haiti, September 29, 1925 (U.S.); *W. C. Fishlock* 47, thickets near the shore, Anagada, October, 1918 (Gray; U.S.); *E. C. Leonard* 4203, vicinity of Fond Parisien, Etang Saumatre, Haiti, May 5–13, 1920 (Chi.; N.Y.; U.S.); *Leonard* 8879, alt. 325–900 meters, vicinity of Ennery, Dept. l'Artibonite, Haiti, January 14, 1926 (Gray; N.Y.; U.S.); *E. C. & Genevieve M. Leonard* 13945, tree 20 feet tall, beach east of harbor, vicinity of Basse Terre, Torue Isl., Haiti, March 22, 1929 (U.S.); *Leonard & Leonard* 13946, tree 20 feet tall, same place and date (Gray; N.Y.; U.S.); *H. Stehlé* 207, alt. 125 meters, plateau, Desirade Isl., W. Indies, November 9, 1935 (N.Y.); *F. L. Stevens* 6152 and 6289, Mona Isl., December 20 and 21, 1913 (N.Y.).

Dodonaea viscosa var. γ **arborescens** f. 4. **hispidula** f. nov.—Ramuli foliaque etiam fructus (praecipue alarum margines) plus minusve patenti-hispiduli. Folia sublate spathulata, apice orbiculato vel subtruncato abrupte mucronulata, plerumque 2.5–4.5 cm. longa et 1–1.5 cm. lata.

Branchlets and leaves and even the fruits (especially the edges of the wings) more or less spreading-hispidulous. Leaves subwidely spatulate, abruptly mucronulate at the orbiculate or subtruncate apex, commonly 2.5–4.5 cm. long and 1–1.5 cm. wide.

Specimens examined: *T. S. Brandegee* 110, Sierra de la Laguna, southernmost Baja California, January 26, 1890 (type, Calif.); *C. A. Purpus* 219, San José del Cabo, southernmost Baja California (Calif.).

Here, as in var. *linearis* f. *arizonica* and var. *vulgaris* f. *eriocarpoidea*, *D. viscosa* shows an approach to *D. eriocarpa*, a species which in its pubescent varieties displays, however, a certain amount of stellate pubescence in the ultimate parts of the inflorescence. The type locality of f. *hispidula* is famous for endemic forms.

Dodonaea viscosa var. δ **Stokesiana** F. Brown, Bishop Mus. Bull. 130: 164. 1935.

The var. *Stokesiana* was described by Dr. Forest Brown from a number of specimens collected in the Austral Islands and on the Island of Rapa, representing an areal extent limited roughly by about 20° and 30° S. Lat. and by about 145° and 155° W. Long. Recently I have examined a specimen of one of the collections cited by Brown (*Mrs. A. M. Stokes* 191, in herb. N.Y.) and have been able to match it closely with several additional specimens not cited by Brown. These are cited below. It will be observed that they extend the known geographic range for var. *Stokesiana* to about 169° E. Long. (Erromango Isl.) and to somewhat less than 17° S. Lat. (Raiatea Isl.).

It is difficult to separate this variety from *D. viscosa* and all its other varieties and forms by any one character, nor indeed did Brown offer a key by which to differentiate var. *Stokesiana*. In a general way, however, the variety tends to differ in its narrower sepals, its sessile or subsessile leaves, its mostly longer and more slender styles, and its smaller and commonly somewhat hispidulous fruits. Brown's description has seemed too scanty. I have therefore drawn up an amplified description from the specimens at hand:

Dodonaea viscosa var. *Stokesiana* F. Brown descript. amplific.—Folia cuneate oblanceolata, inferne sensim ad basim sessilem vel subsessilem angustata, apice plus minusve rotundata et abrupte apiculata, plerumque 7–9 (rarius ±15) cm. longa et 1.5–3 (rarius ±4) cm. lata. Flores minores, 4 vel 5 sepalis linearibus (interdum anguste) vel lanceolatis sparsim hispidulis vix nervatis tantum 1–1.5 mm. longis. Antherae 1.5–2 mm. longae. Stylus debilis, plerumque 5–8 mm. longus, 2- vel 3-partitus, demum saepius persistens. Capsula 2- vel 3-partita -alataque, circ. 6–8 mm. lata, alis angustis (±1 mm. latis) exclusis, extus minutissime irregulariterque hispidula.

Leaves cuneately oblanceolate, gradually narrowed below to a sessile or subsessile base, at tip more or less rounded and abruptly apiculate, commonly 7–9 (more rarely ±15) cm. long and 1.5–3 (more rarely ±4) cm. wide. Flowers smaller; sepals 4 or 5, linear

(at times narrowly so) or lanceolate, sparsely hispidulous, scarcely nerved, only 1–1.5 mm. long. Anthers 1.5–2 mm. long. Style delicate, commonly 5–8 mm. long, 2- or 3-parted, in age more often persistent. Capsule 2- or 3-parted and -winged, about 6–8 mm. wide, the narrow wings (±1 mm. wide) excluded, at surface irregularly and very minutely hispidulous.

Specimens examined: *Degener & Ordoñez* 14205, native name *katasai*, shrub 1–2 meters tall, on bare forehill, alt. 0–450 meters, Maravu, near Salt Lake, Thakaundrove, Vanua Levu, Fiji Isls., January 17–23, 1941 (Arn.); *S. F. Kajewski* 296, native name *Ney-in-temer*, common in poor, red soil, bracken country, tree about 6 meters tall, alt. 300 meters, Dillon (Dillion) Bay, Eromanga (Erromango) Isl., New Hebrides, May 24, 1928 (Arn.; N.Y.; U.S.; a form with elongate, thinner, petiolate leaves approaching those of var. *linearis* f. *angustifolia*); *Archibald Menzies*, Isl. Tahiti (Kew); *T. Powell* 101, Isl. Raiatea, June 29, 1874 (Chi.); *W. A. Setchell & H. E. Parks* 547, shrub up to 10 feet tall, dioecious, fruit light Venetian red, common on dry hillside, Mount Tahara, Isl. Tahiti, July 11, 1922 (Calif., 2 sheets; Gray; U.S.); *United States South Pacific Exploring Expedition under Captain Wilkes*, Isl. Tahiti, 1838–1842 (N.Y., 2 sheets; U.S.);[1] *U. S. S. Pacif. Explor. Exped.*, Fiji Isls., 1838–1842 (N.Y.).

Conspectus of Varieties and Formae of *Dodonaea viscosa* Treated In This Article[2]

Var. *a. vulgaris* Benth., p. 270.

f. 1. *repanda* (Schum. & Thonn.) Radlk. p. 271. Leaves when typical very large (up to ±13 cm. long and to ±4 cm. wide), mostly oblong to subobovate, more often obtuse at apex. Commonly (like the next two formae) glabrous or glabrate.—Florida, Mexico, Central America southward to Bolivia and Brazil, West Indies, tropical East Africa, China, Malay Archipelago, Australia, Polynesia, etc.

f. 2. *Schiedeana* (Schlecht.) Radlk. p. 271. Leaves very long (up to ±16 cm. long and to only ±2 cm. wide), elongately lanceolate, gradually narrowed to both ends. Comparatively infrequent.—Mexico, Guatemala, British Honduras, Peru, Bolivia, Brazil, West Indies (Isle of Pines), British East India, and Isls. Timor and Papua.

[1] This Tahiti material is that referred to by Asa Gray (Bot. U. S. Explor. Exped. 260. 1854) as being a form of *D. viscosa* with "some of the capsules surmounted by a long exserted style, of 3 or 4 lines in length! . . . while other fruits of the same panicle have the usual short style, not exserted beyond the sinus of the wing."

[2] Besides the four varieties presented here, two more are known, both of southeastern Polynesia and of highly localized distribution: Var. ε *minor* Sherff (Amer. Journ. Bot. 32: 212. 1945), known only from the Island of Rapa, and var. ζ *marquesensis* F. Brown (Bish. Mus. Bull. 130: 163. 1935) from the Marquesas Islands.

f. 3. *Burmanniana* (Schum. & Thonn.) Radlk. p. 271. Leaves of medium size (7–11 cm. long and 1.5–2 cm. wide), from oblong to narrowly lanceolate or cuneate or oblanceolate, terminally acute or somewhat obtuse.—Widespread in Mexico, Central America, throughout most of South America, Abyssinia to South Rhodesia, southeastern Asia, Malay Archipelago, Australia, Fiji Isls., etc. Apparently absent (as are the other formae of *D. viscosa* except f. *spatulata*) from Hawaiian Isls. (where it is often simulated by *D. eriocarpa* var. *Degeneri* f. *decipiens* Sherff).

f. 4. *eriocarpoidea* Sherff, p. 284. Leaves often resembling in shape and size those of f. *Burmanniana*, f. *angustifolia*, or even f. *spatulata*. Inflorescences and ultimate branchlets hispidulous.—Known only from Mexico.

Var. β. *linearis* (Harv. & Sond.) Sherff.

f. 1. *linearis* Sherff, p. 285. Leaves linear, now short (±5 cm.) now long (±7–11 cm.); branches of inflorescences (as also in f. 2. *angustifolia*) glabrous to sparsely setulose.—Mexico, Ecuador, Cuba, Haiti, South Africa, Réunion Isl., Formosa, and Australia.

f. 2. *angustifolia* (Benth.) Sherff, p. 287. Leaves linear-lanceolate to linear-oblanceolate, mostly of moderate size.—Florida, Mexico, British Honduras, many parts of South America, southern Asia, Australia, New Zealand, Philippine Isls., etc.

f. 3. *arizonica* (A. Nels.) Sherff, p. 295. Leaves linear; branches of inflorescences hispidulous.—Arizona and Mexico (State of Sonora; apparently replaced elsewhere in Mexico by var. *vulgaris* f. *eriocarpoidea*).

Var. γ. *arborescens* (Cunn.) Sherff.

f. 1. *arborescens* Sherff, p. 297. Tips and lateral margins of leaves more or less sinuate-dentate. This and the next two forms mostly glabrous or glabrate on foliage and fruits.—Rare in Florida and Ecuador; apparently frequent in Australia and Tasmania.

f. 2. *spatulata* (Smith) Sherff, p. 299. Leaves mostly spatulate, entire or but slightly sinuate-dentate, and of small size (more often 3–6 cm. long and 0.7–1.5 cm. wide).—Of widespread distribution: Florida, Mexico, Colombia to Uruguay, tropical East Africa, southeastern Asia, Polynesia (abundant in Hawaiian Isls.), Australia, Tasmania, and New Zealand.

f. 3. *Ehrenbergii* (Schlecht.) Sherff, p. 303. Leaves usually shorter and proportionately wider, more inclined to be broadly rounded or truncate to emarginate at apex, and usually (at least when dry) more of a grayish-green color. Fruits often very small.—Florida and West Indies.

f. 4. *hispidula* Sherff, p. 306. Branches, leaves, and fruits more or less spreading-hispidulous. Leaves small, subwidely spatulate.—Southernmost Baja California.

Var. δ. *Stokesiana* F. Brown, p. 307.—Austral Isls., Erromango Isl. (New Hebrides), Fiji Isls., and Isls. Raiatea and Tahiti (Society Islands).

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[1] As might be expected in a large assortment of *exsiccatae* representing minor, subspecific categories, a few collections will be found to have been referred in one or several herbaria to one entity, in other herbaria to a slightly different one. In a few cases collectors have merged two collections, apparently of really different entities, under one number. In certain other cases the specimens may have come from different parts of the same shrub or tree, thus deceptively identifying one or several of them with the wrong entity. It may be noted, for instance, that poorly selected or somewhat fragmented specimens of *Dodonaea viscosa* var. *vulgaris* f. *repanda* may sometimes lack the large, repandly margined leaves of that forma and pass mistakenly for the f. *Burmanniana*. Or, an atypically small-leaved spray of f. *Burmanniana* will sometimes pass, in the absence of an ample suite of associate materials, as var. *arborescens* f. *spatulata;* and so on. Whatever the reason, however, in all such cases the collectors' numbers have been designated here and in the text proper as "*p. p.*" or "*pro parte.*"

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